SSC San Diego
Command History
Calendar Year 2007

SSC San Diego

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PREFACE

The Space and Naval Warfare Systems Center San Diego (SSC San Diego), Command History for calendar year (CY) 2007 is submitted in conformance with OPNAVINST 5750.12J. The history provides a permanent record of CY 2007 activities at SSC San Diego. Although the history covers one calendar year, much of the information was only available on a fiscal year (FY) basis and is so noted in the text. In addition, some CY 2006 accomplishments were received too late for inclusion in the CY 2006 history and are included here; these are noted in the text.

This Command History is divided into three main sections. The first section is a general introduction to SSC San Diego. The second section describes administrative highlights. The third section documents technical highlights.

Appendices to this document provide supplementary SSC San Diego information. Appendix A lists achievement awards given in CY 2007. Appendix B lists patents awarded in CY 2007. Appendices C and D provide lists of distinguished visitors hosted by SSC San Diego and major conferences and meetings at SSC San Diego, respectively. Appendix E lists acronyms used in the document.

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SECTION 1
INTRODUCTION

INTRODUCTION TO SSC SAN DIEGO

The Space and Naval Warfare Systems Center San Diego (SSC San Diego), is a full-spectrum research, development, test and evaluation, engineering and fleet support center serving the U.S. Navy, Marine Corps, and other Department of Defense and national sponsors within its mission, leadership assignments, and prescribed functions. SSC San Diego reports directly to the Commander, Space and Naval Warfare Systems Command (SPAWAR).

MISSION

SSC San Diego's formal mission is "to be the Navy's full-spectrum research, development, test and evaluation, engineering and fleet support center for command, control and communication systems and ocean surveillance and the integration of those systems which overarch multiplatforms."

LEADERSHIP AND TECHNOLOGY AREAS

Consistent with its mission, eight leadership areas are formally assigned to SSC San Diego. These leadership areas represent SSC San Diego's command, control, communications, computers, intelligence, surveillance, and reconnaissance (C^4ISR) charter and its leadership areas outside that scope—ocean engineering and marine mammals. Beyond these areas, SSC San Diego has demonstrated national and international expertise in a broad range of technology areas.

ASSIGNED LEADERSHIP AREAS

- Command, control, and communication (C^3) systems
- Command, control, and communication systems countermeasures
- Ocean surveillance systems
- Command, control, and communication modeling and analysis
- Ocean engineering
- Navigation support
- Marine mammals
- Integration of space communication and surveillance

TECHNOLOGY AREAS

- Ocean and littoral surveillance
- Microelectronics
- Communications and networking
- Topside design/antennas
- Command systems
- Computer technology
- Navigation and aircraft C^3
- Intelligence/surveillance/reconnaissance sensors
- Atmospheric effects assessment
- Environmental quality assessment

VISION

"SSC San Diego will be the DoD Center of Excellence for Integrated C4ISR in the Maritime Domain across the Full Life Cycle (RDAT&E)."[*]

PROGRAMS

SSC San Diego conducts a broad range of programs that focus on integrated C^4ISR. The Center also conducts several unique programs outside its primary C^4ISR focus: Environmental Quality Technology/Assessment, Marine Resources, Marine Mammals, Ocean Engineering, and Robotics and Physical Security. Innovative research is encouraged through the In-House Laboratory Independent Research and Independent Applied Research programs.

ORGANIZATION

Figure 1 shows SSC San Diego's organization as of 30 September 2007. Table 1 lists new codes assigned as part of the Phase 1 implementation of the Competency Aligned Organization (CAO), 1 October 2007. See discussion of CAO under Strategic Planning and Initiatives.
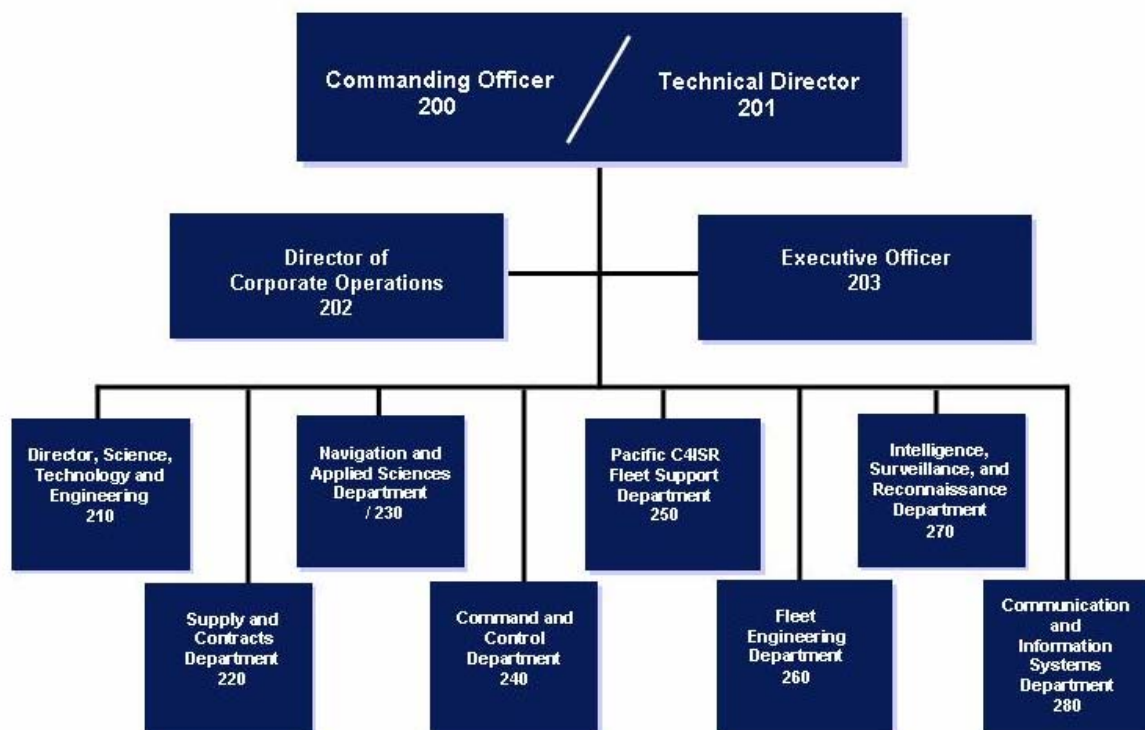
Figure 1. SSC San Diego organization as of 30 September 2007.

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[*] RDAT&E – Research, development, acquisition, test and evaluation.

Table 1. SSC San Diego organization as of 1 October 2007.

New Code	Title
00000	Commanding Officer
00001	Technical Director
00009	Executive Officer
22000	Supply and Contracts Department
41000	Fleet Engineering Department
52000	Pacific C4ISR Fleet Support Department
53000	Command and Control Department
55000	Communication and Information Systems Department
56000	Intelligence, Surveillance, and Reconnaissance Department
71000	Navigation and Applied Sciences Department
73000	Director, Science, Technology and Engineering
81020	Director of Corporate Operations

SECTION 2
ADMINISTRATIVE
HIGHLIGHTS

FUNDING[1]

Total FY 2007 funding was $1.727B, an increase of $257M over FY 2006. Table 2 shows funding by sponsor in FY 2007. Table 3 shows funding by type in FY 2007.

Table 2. Funding by sponsor, FY 2007.

Sponsor	$M
Space and Naval Warfare Systems Command	542
Defense Advanced Research Projects Agency	119
Other Navy	262
Other (includes Army and Air Force)	578
Office of Naval Research	34
Naval Air Systems Command	90
Naval Sea Systems Command	102
Total	**1727**

Table 3. Funding by type, FY 2007.

Type	$M
RDTE	543
OPN (Other Procurement, Navy)	338
OMN (Operation and Maintenance, Navy)	285
Other DoD	495
Other Navy	6
Non-DoD	60
Total	1727

Other FY 2007 financial highlights include the following:
- Total Funding = $1.727B (actual) vs. $1.463B (budgeted)
- Met Carryover Target: $533M (ceiling) vs. $490M (actual)
- Reimbursable = $1188M; Direct Cites = $539M (Total = 1727)

PERSONNEL

PERSONNEL ONBOARD

Total personnel onboard for FY 2007 was 3474. Table 4 lists numbers of personnel by title.

Table 4. Personnel onboard, FY 2007.

Title	No. of Personnel
Scientists and Engineers	1974
Technical Specialists	669
Administrative	478
Clerical	256
Senior Executive Service	6
Wage Grade	15
Officers	48
Enlisted	28
Total	**3474**

MAJOR PERSONNEL CHANGES

Change of Command[2]

Capt. Mark Kohlheim

Capt. Mark Kohlheim assumed command of SSC San Diego from Capt. Frank Unetic on 8 November 2007. Capt. Kohlheim joined the Center from SPAWAR Headquarters, where he served as the Executive Assistant to the Commander, SPAWAR from December 2006 to October 2007.

Capt. Frank Unetic

Capt. Frank Unetic served as SSC San Diego Command Officer beginning 18 August 2005. Before joining SSC San Diego, he served as Executive Assistant to Commander, SPAWAR.

Center Executive Officer[3]

Cmdr. Alan Kolackovsky

Cmdr. Alan Kolackovsky joined the Center in June 2007. Prior to arriving at the Center, he served aboard the USS *Tarawa* (LHA 1).

Cmdr. Michael McMillan

Cmdr. Michael McMillan left the SSC San Diego Executive Officer position and retired from the Navy on 29 June 2007. Cmdr. McMillan joined SSC San Diego in 2006, first serving as the project manager for Fleet Battle Experiments.

PERSONNEL SYSTEM CHANGES

In 2007, the Center closed out the Personnel Demonstration Project and began implementing the National Security Personnel System. See further discussion in the following section, Strategic Planning and Initiatives.

BASE CLOSURE AND REALIGNMENT (BRAC)[4]

Note: This information was received too late to include in the CY 2006 Command History.

The Team SPAWAR leadership met in Norfolk in November 2006 and a standup date for SSC Pacific and SSC Atlantic was established as 1 October 2008 (beginning of FY 2009). At that time, the Center will officially change its name from SSC San Diego to SSC Pacific. The SSC Norfolk San Diego Detachment and the Naval Center for Tactical Systems Interoperability will be welcomed into the Center. The realignment of designated SSC San Diego personnel in Tidewater to SSC Atlantic will also occur at the beginning of FY 2009. The relocation of maritime undersea sensors to the Naval Undersea Warfare Center Newport and maritime surface sensors to the Naval Surface Warfare Center Dahlgren is scheduled for FY 2011.

2007 ORGANIZATIONAL ASSESSMENT SURVEY[5,6,7]

The Team SPAWAR Organizational Assessment Survey (OAS) was conducted in August 2007. The Office of Personnel Management (OPM) administers the survey. The OAS assesses organizational climate and culture in 17 workforce dimensions. Results are used to improve organizational effectiveness. The OAS was administered to all employees (3753); 2356 surveys were completed (response rate: 63%).

Summary of Dimensions

SSC San Diego achieved positive ratings in all 17 workforce dimensions. In 2007, results were equal or better than 2006 results in all dimensions, showing improvement in most (14 out of 17). These results continued a positive trend that began with the first OAS in 2002, in which the Center achieved 12 dimensions with 50% or more favorable responses plus one challenge area (Use of Resources). Results improved in 2004 (15 out of 17 favorable dimensions) and again in 2006 (all 17 dimensions favorable).

Government Activities and Private Industry

Scores compared favorably to the highest scoring government activities that participate in the OAS. Team SPAWAR—of which SSC San Diego comprises a large part—set high benchmarks among large government organizations in 10 of 17 dimensions.

SSC San Diego generally scored similar to or slightly higher than the private sector (except physical working conditions):

- Similar organizational satisfaction
- Slightly more satisfied with employee involvement

- Slightly more satisfied with training and career development
- Similar job satisfaction
- Similar satisfaction with compensation
- Less satisfied with physical working conditions

Highlights

Results for overall job satisfaction included the following:

- 71% responded that they are "Satisfied"
- 11% responded "Dissatisfied"
- 18% responded "Neither"

Other highlights included the following:

- 81% believe their job is important to the success of the SSC San Diego organization
- 78% are proud to tell others that they are part of the organization
- 76% believe that the organization maintains high standards of ethical conduct for all employees
- 72% believe the organization is committed to using methods to effectively improve process

CUSTOMER SATISFACTION[8]

In CY 2007, SSC San Diego conducted 476 customer satisfaction surveys. The surveys show a very high level of customer satisfaction. Figure 2 shows the average rating in five areas: quality, schedule, budget, overall, and relationship.

CY 2007 (476 surveys)

Q1: Quality 2.49
Q2: Schedule 2.41
Q3: Budget 2.15
Q4: Overall 2.51
Q5: Relationship 2.58

Key
3 = Extremely Satisfied
2 = Very Satisfied
1 = Well Satisfied
0 = Adequately Satisfied ("No complaints")
-1 = Slightly Dissatisfied
-2 = Very Dissatisfied
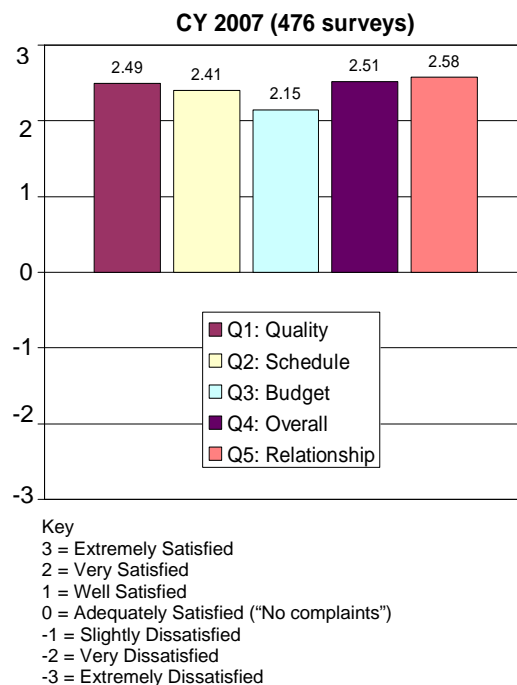-3 = Extremely Dissatisfied

Figure 2. SSC San Diego customer satisfaction surveys.

STRATEGIC PLANNING AND INITIATIVES

HIGHLIGHTS[9]

- *National Security Personnel System (NSPS).* The command was brought into NSPS. The Center closed out the Demonstration Project. The first cycle of NSPS was completed. (See NSPS discussion below for further details.)
- *Navy Enterprise Resource Planning (ERP).* The Center continued implementation of Navy ERP. All 3900 users were mapped to their Navy ERP roles. The training of more than 90 site representatives was scheduled to begin in January 2008, and the Center was on schedule for the assigned April 2008 "Go-Live" date. (See Navy ERP discussion below for further details.)
- *Competency Aligned Organization (CAO).* The Center implemented Phase One of SPAWAR's CAO Integrated Product Team restructuring. Tier 1 and Tier 2 leads were identified and work on the draft 6.0 Concept of Operations and Competency Development Model framework was begun. In 2008, the competency domain leaders will develop and supply clearly defined paths for career growth, standard processes, and "rules and tools" across the Team SPAWAR. (See CAO discussion below for further details.)
- *Lean Six Sigma (LSS).* As of December, the Center had 19 trained Black Belts (toward its goal of 37), and 86 active Green Belts (toward its goal of 186). The Center expects to train an additional 5 to 7 Black Belts and 50 to 55 additional Green Belts in 2008. (See LSS discussion below for further details.)
- *Business Mode Changes.* The Center reported a total of 35 Project Management Guide (PMG) implementations and an additional five Project Management Core Courses were conducted. (See PMG discussion in "Project Best Practices" below for further information.)
- *Capability Maturity Model Integration (CMMI).* The Center commenced a major commitment of resources to excellence in systems and software engineering through the CMMI implementation initiative. The Center conducted an extensive Class C Center appraisal that provided a detailed snapshot of overall Center process maturity. Nine Center projects attained CMMI Maturity Level 2. In 2008, the Center's goal is to successfully accomplish Center-wide Maturity Level 2. (See related discussion [CMMI] below.)

NATIONAL SECURITY PERSONNEL SYSTEM (NSPS)[10]

Note: The following was summarized from a series of articles published in the *Outlook* throughout 2007. The articles were prepared by the Center's NSPS Transition Lead to inform employees of the NSPS conversion process and impact and provide extensive detail. This summary is specific to SSC San Diego; general NSPS background information may be found at the NSPS website.[11]

Authorized by Congress as part of the fiscal 2004 National Defense Authorization Act, NSPS was designed to promote greater rigor in performance appraisals, more flexibility in hiring and recruiting, and maximum latitude in rewarding outstanding performance.

SSC San Diego employees were converted from the Demonstration Project to NSPS on 15 April 2007. SSC San Diego was the first Navy Working Capital Fund organization to be converted, and the single largest part of the SPAWAR claimancy to adopt the new personnel system. Preliminary work to ensure that pre-conversion data were accurate resulted in a low number of manual entries. Only 13 names had to be entered into the system manually to achieve 100 percent completion. This was one of the lowest manual data entry rates of any command.

SSC San Diego's non-supervisory Technical Specialists and Administrative Specialists were converted into the NSPS Standard Career Group – Professional/Analytical Pay Schedule (YA). This is the pay schedule for employees who are associated with the DA or DS career paths under the Demonstration Project. Technicians were converted into the NSPS Scientific and Engineering Career Group – Technician/Support Pay Schedule (YE). This is the pay schedule for employees who were generally associated with the DT career paths under the Demonstration Project. Clerical employees and assistants were converted into the NSPS Standard Career Group – Technician/Support (YB). This is the pay schedule for employees who were generally associated with the Clerical/Assistant (General) (DG) career path under the Demonstration Project. All personnel under a student appointment were converted into the NSPS Standard Career Group – Student (YP) Pay Schedule.

The first performance period for NSPS was 15 April to 30 September. In June–July, Center supervisors conducted a mid-cycle performance review. The review was unique in that it was accompanied by a mock payout to improve the process before the final review for the performance cycle ending 30 September. Performance Appraisal Application Version 2.0, a Web-based tool, was released to support the performance planning and appraisal process. Supervisor recommendations and pay pool assessments in October determined ratings and performance payouts in January 2008.

NAVY ENTERPRISE RESOURCE PLANNING (ERP) PROGRAM[12]

Note: The following was summarized from a series of articles published in the *Outlook* throughout 2007. The articles provide additional details on the topics discussed. More information, including general background, discussion of program functionalities (e.g., financial, program management, workforce management), program deployment, training schedules and courses, may be found in "Navy ERP Program," SSC San Diego SD 767.[13]

Team SPAWAR began the process for transition to Navy ERP in CY 2006. Navy ERP is a state-of-the-art management system that will integrate the processes and procedures the Navy uses to manage its money, acquisition, programs, people, supplies and maintenance. A joint Team SPAWAR-Navy ERP Leadership Summit was held on 11 December 2006, to discuss efforts for Navy ERP implementation. Some of the efforts leading up to the rollout included preparing business data for conversion, ensuring that contracts development software is compatible, and preparing the workforce to use this new capability.

SPAWAR is seen as a model for implementation. The Command will be the first organization to implement Navy ERP over an entire command at the same time. As discussed at the Leadership Summit, the Office of the Secretary of Defense will be watching the deployment at SPAWAR with the intent of rolling it out to all of the Department of Defense.

In early April 2007, the SPAWAR Enterprise Business Office hosted representatives from the Navy ERP Office and Team SPAWAR for a 2-day conference to kick off the 12-month deployment activities for the new ERP implementation. Navy ERP will be implemented in April 2008.[14]

Background

Project Cabrillo, the ERP program used at SSC San Diego, was one of four pilot programs implemented within the Department of Navy (DoN). Project Cabrillo, first rolled out in July 2001, resulted in a nearly 50-percent cost savings for the Center's business systems support expenses, as well as various other incidental savings. Project Cabrillo also brought about a drastic reduction in processing time for many business activities. Its success was one of the factors that prompted the Navy to design an ERP solution for Navy-wide distribution.

Navy ERP will be a consolidation of processes from each of the pilots into a single solution. It will standardize all DoN business operations for consistency and proper alignment. The DoN will leverage this capability to balance priorities and deliver increased effectiveness and efficiency, ultimately resulting in cost savings. Navy ERP will eliminate redundancies in many day-to-day operations.

Change Management

The SPAWAR Enterprise Business Office Organizational Change Management team, in partnership with the Navy ERP Organizational Change Management team, traveled to multiple SPAWAR sites to conduct interviews and focus groups to gauge each site's understanding of Navy ERP. Change Readiness Assessment activities included leadership interviews, focus groups, and the Workforce Readiness Survey. As a result of these activities, specific Navy ERP concerns and benefits were identified from the end-users and their supervisors to help ensure that readiness and progress is maintained throughout the implementation of Navy ERP. In addition, Change Agents were identified to serve as a liaison to the Navy ERP Communications Team to relay key messages about Navy ERP to stakeholders across the organization throughout the implementation.

Data Conversion

Data conversion is one of the key elements affecting the length of the Navy ERP transition period. Team SPAWAR is performing a sequence of mock data loads to ensure all data is carried over properly. Before Go-Live, Team SPAWAR is expected to complete four mock data conversions and two cut-over practices to reduce the length of the transition period.

Individual User Roles

Approximately 70 percent of the workforce will be "basic users." Activities include timekeeping, award submissions, training and leave requests, and verifying benefits. Approximately 30 percent of the workforce will be "power users." Activities include financial, budget, asset management, procurement processing/reconciliation, and program budget planning and simulation.

Training

Most Navy ERP users will require only a few Web-based training courses, one of which will cover time entry. Others will require the Web-based training followed by one or more instructor-led courses. Twenty-four core trainers were appointed to complete training localization across Team SPAWAR, including eight from SSC San Diego. Localization reviews the existing Navy ERP course materials to determine what information is important and relevant to Team SPAWAR. Training localization must be completed prior to train-the-trainer events. SSC San Diego site trainers were scheduled to receive training from Navy ERP consultants and Team SPAWAR core trainers during the train-the-trainer events in January 2008. Web-based training was scheduled to begin in February 2008, with the first instructor-led training commencing in March.

Benefits

The Navy ERP solution will allow the Navy to unify, standardize, and streamline its business activities into one system that will achieve the highest standards for information that is secure, reliable, accessible, and current.

COMPENTENCY ALIGNED ORGANIZATION (CAO)[15]

Introduction

On 1 October 2007, the SPAWAR enterprise began Phase 1 of a three-phased implementation of the Competency Aligned Organization (CAO) Integrated Product Team (IPT) restructuring.

A CAO is an organizational construct that improves the focus on and management of the Command's workforce, processes, and workload, with the ultimate goal of facilitating the matching of workforce supply with workload demand. The heart of the CAO construct is the use of multi-disciplinary teams to satisfy customer requirements using common technical and business processes defined by their competencies. The transformation of Team SPAWAR into a CAO is intended to create an agile and aligned organization capable of responding to work demand signals generated by our customers in a disciplined and cost-effective manner.

Through the CAO, the SPAWAR enterprise will attain five strategic outcomes: (1) deliver responsive, high-quality capability, (2) achieve proper organizational sizing and skill balance, (3) improve cost effectiveness, (4) promote clarity through execution of an interdependent organization, and (5) increase workforce competency and leadership.

The transition to a CAO organization will allow Team SPAWAR to work in a model known as a CAO CAO IPT, a structure in which people are organizationally aligned by the functions they perform and the knowledge and skills they possess.

Background

The CAO effort began in June 2006. Representatives from across Team SPAWAR met to define desired outcomes and recommend an organizational model in order to improve the ability to deliver outstanding command, control, communication, computers, intelligence, surveillance and reconnaissance (C4ISR) products more effectively.

These outcomes included agility, increased response time, innovation, and a comprehensive customer solution. This team assessed benchmark CAOs and conducted an organizational analysis of alternatives. The Team SPAWAR leadership team evaluated many competency-focused organizations, including several from industry and other government organizations, before the final organizational construct was complete and recommended for adoption.

In December 2006, the Executive Decision Board decided that a CAO model is the best solution to meet customers' needs and help strengthen the connections across the workforce. This decision resulted from many months of analysis with inputs and advice from other agencies, systems commands, and industry that have undertaken similar changes.

Implementation

Implementation of the CAO will take place in three phases. Phase 1 (completed 1 October 2007) identifies the competency leadership and initial mapping of individuals to competencies. Phase 2 (planned Quarter 1, FY 2009, October–December 2008) involves a personnel shift of general fund billets into appropriate competencies. Phase 3 (planned Quarter 1, FY 2010, October–December 2009) includes individual personnel shifts of Navy Working Capital Fund billets into appropriate competencies, and the creation of appropriate rate structures to support such moves.

At that point, SPAWAR will be fully aligned into a CAO IPT structure. This construct will realize Assistant Secretary of the Navy (Research, Development, and Acquisition) and Chief of Naval Operations goals for a more agile and efficient systems command and program executive office (PEO)

structure. It will match worker talents with customer needs, and align employee skills and talents to program demands. The CAO IPT structure will improve workforce flexibility and career growth through improved knowledge, skills, and abilities.

LEAN SIX SIGMA (LSS)[16]

As of December 2007, the Center had 19 trained Black Belts, toward a goal of 37 (1% of the workforce) and 86 active Green Belts, toward a goal of 186 (4% of the workforce). These goals are in line with Navy standards for total numbers of Black Belts and Green Belts. The Center expects to train an additional 5 to 7 Black Belts and 50 to 55 additional Green Belts in 2008.

LSS is an improvement methodology that has been embraced throughout the Navy. The aim of LSS is to eliminate process waste and improve process performance and predictability. The "lean" part of Lean Six Sigma was taken from the lean manufacturing techniques used by Toyota. "Six Sigma" was adopted from the process improvement tools and philosophy developed by Motorola in the 1980s.

Several successful LSS "events" were conducted across the Center.

Purchase Card Process

The Ocean Systems Division completed a cross-departmental LSS event to improve their Purchase Card process. Team accomplishments included a reduction of processing time and costs associated with purchase requests.

This event was taken on to solve some known issues with the Purchase Card process including:

- Lack of understanding of the process and rules associated with using Purchase Cards because of the constant changes in policy and confusion with EIT (Electronic and Information Technology) forms.
- Lack of a clear, up-to-date, documented, and standardized process to follow.
- Too many training requirements.

The team defined goals based on what was critical to the customers of the Purchase Card process. They conducted a value stream analysis to determine if any steps were non-value added. They also analyzed the causes of issues and brainstormed potential solutions. An improved, streamlined process that adopted the best solutions was then developed, along with a roll-out plan to implement the new process, and a control plan to track future performance.

Three solutions were adopted to improve efficiency:

- Centralize the credit card process by assigning two primary Purchase Card holders at the YB2 level for the Division. Assign two approving officials. This will reduce labor and training costs associated with purchase requests, free engineers from processing credit card transactions, and allow the Purchase Card holders to become experts on procedures and policies. Card holders will become more efficient, and build a rapport with the vendors and the shipping/receiving department. The centralized Purchase Card holders will also provide goods receipt and acceptance, bar-coding of plant account items, and delivery to remote locations.
- Create a database that generates useful reports for the end-user, buyer, and approving official; and a front-end for the requestor to enter purchase requests. This database would standardize the input and eliminate multiple e-mail exchanges between the requestor and buyer. Useful tools and links to commonly used Web sites would be added with instructions on filling out an EIT form. Approving officials could easily note split purchases.
- Document the process to provide a reference on the exact procedures to follow for Purchase Card transactions. This would help with training and turnover.

Pilot results show a reduced average order-placement time from 2 business days to 0.86 business days and a reduced average order-receive time from 5 workdays to 3.4 workdays. The labor costs of Purchase Card holders were also significantly reduced from $171.00 per transaction to $90.00 per transaction.

Office of Patent Counsel

The Office of Patent Counsel successfully revised and standardized a step in the patent application process that is anticipated to generate a $10 thousand per year savings by significantly reducing the amount of time spent processing documents. Substantial additional savings are anticipated by new processes for centralized storage, a periodic file backup, and standardized computer file names.

The team focused on a significant and manageable step in the patent application process. The patent attorneys, patent assistants, and technical transfer agents must access and share files previously named and filed by individual authors and users. The files are then stored in a number of locations making their tracking and retrieval difficult, time-consuming, costly, and delay the inventors' efforts.

The LSS team analyzed, evaluated, and refined their value stream using the five stages of LSS quality improvement and assurance: design, measure, analyze, improve, control. The new, standardized method is now an integral part of the patent application process. Metrics are being applied to evaluate its success and it will be evaluated every 6 months with revisions and improvements made as needed.

Classified Inventory

The Classified Inventory LSS team reviewed and improved the annual classified material inventory process. The team's improvements were applied to the annual inventory conducted during August 2007. In previous years, the classified material inventory had taken as long as 12 months to complete, had no standardized process or timeline, and involved as many as 55,000-plus classified holdings. The project team focused on defining and revising the current process and making improvements by removing obstacles, automating the process where possible, and documenting the results. Handheld barcode scanners were made available to automatically generate inventory lists, and defective barcodes were replaced.

The improved process was put to the test in August, with 29,018 holdings and 579 custodians involved in the inventory. The inventory was successfully completed within the predicted 1-month period. Holdings were reduced to 28,447, and 50 fewer custodians were required to complete the process. The project team's efforts provide an anticipated cost savings of $300,000 per year.

CMMI Compliance Levels

The Communication and Information Systems Department completed an LSS event that improved compliance levels of the measurement and analysis (M&A) process area of Capability Maturity Model Integration (CMMI). The team's accomplishments increased the compliance levels of six targeted projects from an average of 3percent to an average of 72 percent.

The team developed an M&A Process and Implementation Guide with detailed instructions on how to conduct M&A. A Web site offers training materials, M&A plans, M&A data collection tools, and other artifacts to help future projects. Results have shown a significant decrease in the level of effort needed to provide project status reports once a data collection process is in place.

This LSS event was chosen because it was the CMMI process area with the greatest need for improvement. The goals of the LSS team were to increase the M&A process compliance on targeted projects by developing individual project M&A plans and creating an efficient process for future efforts. The LSS team developed an M&A LSS project charter, determined the primary wants and

needs of the customers, and planned how to measure success. The success of the targeted projects was measured by the progress made toward M&A compliance, the number of M&A samples and artifacts on the Process Asset Library, and by the amount of effort expended to collect data for project status reporting. The team also identified ways to strengthen the enablers and reduce the inhibitors. This led to a selected set of solutions including training and mentoring project team members; populating the Process Asset Library with M&A artifacts such as M&A plans and data collection tools; providing contact information for M&A; developing detailed instructions for each step in the process; and providing M&A relative terms and definitions. The team also developed an implementation and control plan to facilitate the M&A process roll out and control function.

Crypto Equipment Repair Facility[17]

An LSS team from C4I Systems Support was tasked to analyze the Crypto Equipment Repair Facility (CRF) at Naval Station 32nd Street. The team studied and analyzed the process of receiving, repairing, and returning the various pieces of crypto equipment to the Fleet. The team's analysis revealed that there was a significant bottleneck in the repair process. It became their goal to improve the process flow of electronic equipment repair and also improve the storage and accountability for repaired circuit cards.

During the study of the CRF repair procedures, the team followed a piece of equipment from the time it was received until it was ready for shipping. This ensured that all members of the team fully understood the details of the entire repair flow. Additionally, the team identified the various CRF customers and made a detailed study of the "customer requirements." This allowed the team to focus on those "critical to customer" requirements that added value to their process.

The team then developed detailed process flow maps of the existing equipment repair process. From this map, the team identified problem areas, identified steps that could be eliminated, and developed solutions and improvements. Ultimately, the team identified three significant bottlenecks in their process. The team reshaped the way electronic equipment is processed and the actual flow of the equipment through the CRF. Additionally, the team developed a new tracking, accounting, and storage process that saves time in locating circuit cards.

Pilot results show that improvements at CRF will save technicians time in repairing equipment and tracking and accounting for each piece. The improvements will provide better storage and will improve overall equipment repair times. Labor cost reductions will result in an estimated cost savings of approximately $120 thousand per annum for the facility.

PROJECT BEST PRACTICES[18]

Seven Center projects were objectively verified as having fully implemented the practices described in the SSC San Diego Project Management Guide (PMG). These projects were recognized by SPAWAR Commander Rear Adm. Mike Bachmann on 18 May 2007 at the SSC San Diego Echelon III Review.

The seven Center projects recognized included:

- Meteorological Mobile Facility (Replacement) (see project description below)
- High Assurance Platform (see further discussion below)
- Global Positioning System User Equipment Identification Database (see project description below)
- Tactical Communications Solutions
- Antenna Tilt Group
- In-Line Network Encryption (see project description below)

- National/Multi-Service Electronic Key Management System National Tier 3

Background

In January 2005, the Center compiled a set of project management best practices into the official SSC San Diego PMG. The PMG provides project managers at SSC San Diego with the vision, information, resources, and activities to successfully plan, execute, and control projects. These practices help ensure that the Center consistently delivers innovative and quality products and solutions on time, within schedule and budget constraints, and with minimal risk. The guide provides the vision, information, resources, and activities to successfully plan, execute, and control projects, regardless of the technology area or size.

To evaluate a project's progress in implementing the best practices, the PMG provides a framework for objective verification. Objective verification is defined as credible assurance that the functions, activities, processes, work products, and/or services are performed, produced and /or rendered, against established best practices, standards, and procedures, and that non-compliance issues are addressed.

Meteorological Mobile Facility (Replacement) (METMF(R))

METMF(R) is a lightweight weather forecasting system contained in a mobile shelter. The PMG facilitated and reenergized METMF(R) best practices.

In 1964, Marine Corps weather units received their first evolution of the Meteorological Mobile Facility. This METMF consisted of four mobile International Standards Organization shelters. Through the years, rudimentary upgrades to METMF were conducted to maintain the basic services to aviation. As a result of post Operation Desert Storm lessons learned, an operational requirements document was developed to respond to Marine Corps meteorology and oceanographic (METOC) requirements. In 1993, SSC San Diego began to design and develop the METMF(R) to resolve the deficiencies identified in Desert Storm. SSC San Diego produced 12 METMF(R) units that were fielded to the Fleet Marine Force. Currently, the METMF(R) provides 10 units to the Marine Air-Ground Task Force, 5 of which are fielded in Iraq in support of the Global War on Terror. SSC San Diego's METOC and Joint Systems Branch provides in-service engineering agent services for the METMF(R) and PMW 180 acquisition support for development of the METMF(R) Next Generation.

Implementing the PMG facilitated and reenergized many METMF(R) best practices. One area in particular was risk assessment. Previously, risk assessment was conducted at a programmatic level. The team thought that this best practice would be very helpful at the engineering level of the project and brought in a risk expert to assist with training. The team then prioritized risks associated with engineering change proposal tasks. Each risk was given a description, key sources, mitigation, contingency, assigned impact/probability, and exposure. This proved to be very successful and was rolled into the PMW 180 Quarterly Performance Reviews.

High Assurance Platform (HAP)

The HAP program is a National Security Agency initiative to develop a computing platform framework that allows commercial off-the-shelf technology to be used safely in high-assurance applications across multiple domain sensitivities. As one of the core technology foundations for Assured Information Sharing under the Global Information Grid, HAP will provide the capability to access multiple domains from a single computing platform and allow secure data movements between domains to increase efficiency of operation while reducing costs. Tactical environments will be able to take advantage of the reduced footprint, space, weight, and power of HAP computing platforms.

Successful implementation was due largely to Software Process Improvement Agent efforts, leveraging as much of what the project was already doing to satisfy the PMG requirements.

Global Positioning System (GPS) User Equipment Identification Database (GUIDE)

The GUIDE system is a net-centric, Web-based application that services the needs of stakeholders within the GPS community. The current stakeholders include the GPS User Equipment Integration and GPS User Equipment Foreign Military Sales groups located at Los Angeles Air Force Base; the GPS User Equipment Sustainment personnel at Warner Robins Air Force Base, Georgia; and the Navigation Systems Program Office (PMW 170). These stakeholders use GUIDE to manage and track GPS equipment with respect to their individual missions.

The GUIDE system consists of a relational database that houses information on GPS user equipment such as receivers and antennas. GUIDE users can create relationships between the GPS equipment and other data elements such as platforms (aircraft and ships), integration schedules, and repair and maintenance records to successfully manage their tasks. The database is shared among all GUIDE stakeholders and is accessible via a Web-based graphical user interface. GUIDE consists of three servers: a Web server, an application server, and a database server. It is currently in a maintenance life cycle and receives approximately $90,000 in funding annually.

This PMG focused on leveraging previous work done toward achieving "Best Practices," implemented current processes, and documented the processes in a Project Management Plan.

In-Line Network Encryption (INE)

The INE project is a service-oriented project that provides a primary source of INE information and assistance to all U.S. Navy, Marine Corps, and Coast Guard programs of record, sponsors, and Navy users. The scope of the project covers products from more than six vendors, supporting 20 different encryptors, over three different network architectures. These products support seven major programs and many smaller efforts. The objective is to ensure that the Navy users have the INE they need when necessary to support system requirements. This includes INE support for Navy initiatives such as Everything-Over-Internet Protocol and the transition to IPv6.

CAPABILITY MATURITY MODEL INTEGRATION (CMMI)

Capability Maturity Model Integration (CMMI) Level 2: Joint Project Manager for Information Systems (JPM IS)[19]

Note: JPM IS project achieved CMMI Maturity Level 2 in August 2006.

JPM IS products were evaluated in eight capability areas, and evaluations led to a determination of Capability Maturity Model Integration (CMMI) Level 2.

JPM IS efforts provide life-cycle support to three information system programs of record (PORs) and support information technology (IT)-related software systems:

- Joint Warning and Reporting Network (JWARN), which networks nuclear, biological, chemical, and radiological (NBCR) sensors and C4ISR tools to automatically generate plots of affected areas and provide early warning to military forces
- Joint Effects Model, which provides the capability to predict the transport, dispersion, and effects of NBCR events
- Joint Operational Effects Federation, which provides the joint warfighter with a model-based NBCR analytical and decision support system

JPM IS supports all joint project managers within the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) through the Software Support Activity (SSA). The SSA provides enterprise-wide support related to standards and policies, architectures, data, information assurance, modeling and simulation, science and technology transition, and help desk. The SSA effort was evaluated separately from the information system PORs. The two efforts were evaluated in eight capability areas. Evaluations determined that both were operating at Level 3 in seven of the eight capability areas, and Level 2 in the remaining area. This led to a CMMI Level 2 determination.

CMMI-Development Level 2: MGF[20]

Three projects of the Maritime Global Command and Control System (GCCS) Family of Systems (MGF) business area of the Command and Intelligence Division achieved CMMI Development (CMMI-DEV) Maturity Level 2 in November 2007. Appraisal results also indicated that the team is performing at a Capability Level 3 implementation of the Level 2 process areas.

This assessment was based on a Standard CMMI Appraisal Method for Process Improvement (SCAMPI) Class A appraisal. The three projects evaluated within the business area included the GCCS-Maritime (GCCS-M) Ashore, GCCS-M Afloat, and Theater Battle Management Core System. These projects have a combined staff of over 110 people. MGF is the largest team at the Center to achieve CMMI Maturity Level 2. MGF is the fourth group at the Center to meet the CMMI Maturity Level 2 challenge.

MGF provides joint command and control solutions, including targeting support, chemical-biological indications and warnings, and logistics support. It integrates the real-time Common Tactical Picture and near real-time Common Operational Picture. MGF acts as the Trusted Agent for systems sustenance, facilitating the decomposition of requirements into engineering solutions.

The MGF team performs independent verification and validation testing, configuration management, fleet installation of newly released software, and fleet introductory training. Additional services include the software configuration management of software builds.

The Capability Level 3 achievement in the process areas re-establishes SSC San Diego's Command and Control Department's Process Asset Library as an appropriate and frequently cited standard process repository. The department's tailoring guidelines established its processes as a Capability Level 3 best practice in support of the 50-plus projects in the department.

COMMUNITY OUTREACH

COMMUNITY ASSISTANCE AND SERVICE

San Diego County Fires Community Assistance[21]

Numerous Center employees provided their time, material contributions, and homes for evacuees during San Diego County fires that occurred in October 2007. The Center established a resource website at https://iweb.spawar.navy.mil/resources/firehelp/ to provide a means to offer assistance to co-workers and others in need.

During the crises, the Center made positive contact with all employees and learned some valuable lessons that can improve the mustering process in the event of a future crisis. The Navy Family Accountability and Assessment System (NFAAS) website went into use as a tool to assist the workforce. Using NFAAS, the Navy identified active duty and Navy civilian employees needing assistance, and assigned case managers to provide personalized support.

Disaster relief, rescue, or public safety activities offered during the fires by Center employees included:

- working with the San Diego County Search and Rescue Response Team
- working at shelters at Naval Air Station North Island and the Naval Amphibious Base to identify immediate needs of evacuees
- providing medical assistance to evacuees
- serving as Cuyamaca College liaison to the Local Assistance Center to coordinate efforts by San Diego County, the Federal Emergency Management Agency (FEMA), Small Business Association, the American Red Cross, and 20 other organizations
- working with the County Sheriff's Department Search and Rescue Bureau to locate fire victims in unincorporated areas
- assisting evacuees at Qualcomm Stadium
- manning Community Access Phone Service lines
- providing emergency communication services to Red Cross shelters

Operation Clean Sweep[22]

On 2 June 2007, SPAWAR/SSC San Diego military and civilian Navy divers participated in the 17th Annual Operation Clean Sweep. Operation Clean Sweep is a community service event in which divers search the floor of San Diego Bay to remove trash. It is the only environmental cleanup of its kind in the State of California. The Navy partnered with the San Diego Port Tenants Association, the U.S. Coast Guard, local industry, and community organizations.

EDUCATION AND CAREER OUTREACH

Ed Tech Fair[23]

SSC San Diego participated in the San Diego County Educational Technology (Ed Tech) Fair on 14 March 2007. Center personnel presented speech recognition technology and displayed Center scientific research and development in robotics. Approximately 2500 high school and middle school students visited the booth displays from government and industry and spoke with the representatives about science and technology.

Gompers Charter Middle School Science Night[24]

SSC San Diego and the University of California San Diego hosted Gompers Charter Middle School at their first Science Night on 22 February 2007. Twenty science demonstrations were developed by SSC San Diego personnel for this event. The Center is in the process of formally adopting Gompers to continue enriching their students' education. Gompers was a disadvantaged, inner-city school that changed from a public school to a charter school.

Hiring Our Heroes Career Fair[25]

SSC San Diego personnel accepted résumés at the Hiring Our Heroes Career Fair at the Marine Corps Air Station, Miramar, on 31 July 2007. The Hiring Our Heroes Career Fair provided an opportunity for wounded service members and their spouses to learn about jobs in the federal government and in the private sector.

Mid-Career Hiring Fair at Liberty Station[26]

The Mid-Career Hiring Fair at Liberty Station was held 24 July 2007. The hiring fair targeted applicants in technical fields.

2007 MESA Shadow Day [27]

SSC San Diego hosted the Mathematics, Engineering, Science Achievement (MESA) Alliance Shadow Day 2007 on 15 November. The MESA Alliance Centers from San Diego State University, San Diego City College, and Southwestern College sponsored the 2007 Shadow Day. The MESA program serves educationally disadvantaged students and underrepresented student populations by giving them exposure to engineering and science work environments. SSC San Diego professionals mentored students for the day. Students typically shadow a math, science, or engineering professional throughout the day, giving the students an overview of the Center and an opportunity to see work in progress.

Middle School Career Day[28]

SPAWAR and SSC San Diego represented the Navy in a community outreach effort in February for the Creative, Performing, and Media Arts Magnet Middle School's annual career day. Careers in science and technology were presented, with a focus on work performed at the Center.

NPS Student Research Fellowship Program[29]

Under the Student Research Fellowship Program, two Naval Postgraduate School (NPS) students completed a working prototype now being used successfully in Afghanistan and Iraq. The fellowship project was the Field-Level Computer Exploitation Package, a portable, solid-state device capable of interrogating a computer system to gather intelligence information in the field. SSC San Diego has sponsored the Student Research Fellowship Program at the NPS since 1994. This program promotes partnerships with NPS, addresses SSC San Diego research focus areas, and fosters long-term professional associations with SSC San Diego technical personnel and management.

Silvergate Elementary School[30]

During the 2007 outreach effort to Silvergate Elementary School in Point Loma, 120 students were given an opportunity to observe and operate three Man-Transportable Explosive Ordnance Disposal (EOD) robots owned by the Center and used in Iraq and Afghanistan by EOD teams. Prior to the visit, the children had been studying robotics for their science classes.

St. Mary's Academy[31]

Students from St. Mary's Academy in Inglewood, California, visited SSC San Diego to meet Center scientists and observe laser technology, robotics, and shipboard antennas and brass model ships. They learned about careers in engineering and science, as well as job possibilities in engineering and science at the Center.

Arroyo Vista Charter School[32]

On 30 October 2007, Unmanned Systems Branch personnel presented the Center's robotics technology to elementary school students at Arroyo Vista Charter School in Chula Vista.

Autonomous Underwater Vehicle Competition[33]

The 10th Annual International Autonomous Underwater Vehicle Competition was held 13–15 July 2007 at SSC San Diego's Transducer Evaluation Center (TRANSDEC). Participating in the competition were 28 teams from major universities and educational institutions, including college teams from the United States, Canada, Japan, and India. Three high school teams also participated.

The University of Florida Gators took first place. This win is their third consecutive victory. The U.S. Naval Academy took seventh place for their first-time entry. The final competition standings were

1. University of Florida
2. University of Rhode Island
3. Ecole de Technologie Superieure (Montreal, Canada)
4. Cornell University
5. University of Central Florida
6. University of Southern California
7. U.S. Naval Academy

During the event, student teams deployed "smart" robotic submarines intended to navigate an underwater course without human intervention. The "mission" for each team was to complete challenge courses with specific tasks, such as docking at an underwater station, marking a location, and recovering an object. Each student team designed and built an autonomous vehicle specifically for this competition.

Throughout the competition, exhibits and demonstrations of current military robotic technologies were available to the public. This was the sixth consecutive year that SSC San Diego has hosted the event at the TRANSDEC pool.

University of Hawaii[34]

On 16 March, Pacific C4ISR Department personnel introduced career opportunities at SSC San Diego to young engineers and scientists attending the University of Hawaii College of Engineering Spring 2007 Career Day.

Point Loma Public Library Exhibit[35]

"SSC San Diego – Since 1940: On Point and at the Center of C4ISR" was the theme of the Center's community exhibit at the San Diego Public Library, Point Loma Branch. This was the second year that the Center displayed historical items and project photos from the past and present. The 2007 exhibit featured posters and photos highlighting some of the Center's current technology.

SECTION 3
TECHNICAL HIGHLIGHTS

SCIENCE AND TECHNOLOGY

Innovation Center: AC2 for Unmanned System of Systems Project[36]

In July 2007, SSC San Diego inaugurated its new Innovation Center and process with the Autonomous Command and Control (AC2) for Unmanned System of Systems project. SSC San Diego's Innovation Center provides a mechanism for investigating high-risk/high-payoff solutions to Navy engineering challenges or problems, and accelerating exploration of new ideas.

Innovation Center research teams are trained to explore new ideas and concepts that directly support SSC San Diego's strategic goal to deliver innovative products and services. Three- to six-member teams of appropriate subject-matter experts focus on specific problems or challenge areas of ongoing programs, or explore new projects proposed by potential sponsors. The Innovation Center provides workspace for the multi-disciplined teams to concentrate entirely on the goals of the project for a 6-month period. The teams are dedicated to the project full time.

The AC2 for Unmanned System of Systems project seeks to identify the command and control (C2) functions and requirements for operating large-scale, collaborative, autonomous, and heterogeneous unmanned systems for a next-generation distributed force. The AC2 team developed a plan that defines autonomous C2, outlines the C2 gaps for distributed families of unmanned systems, and recommends solutions for implementing future C2 architectures.

NAVIGATION AND APPLIED SCIENCES

UNITED KINGDOM OCEAN SURVEY PROGRAM SURVEY SYSTEM (UK OSPSS)[37]

SSC San Diego successfully conducted annual updates to the United Kingdom Ocean Survey Program Survey System (UK OSPSS). The 2007 system update will enhance and improve OSPSS data handling and processing capabilities and will improve overall system reliability and maintainability. The Marine Navigation Division is the OSPSS Technical Design Agent for the UK Ministry of Defence, and is responsible for the development, implementation, test, and evaluation of all OSPSS updates aboard HMS SCOTT and for the Data Refinement System at the UK Hydrographic Office.

SSC San Diego hosted the tenth annual UK OSPSS Operational Support Review meeting 16-17 April 2007. Representatives from UK Ministry of Defence and the Royal Navy indicated their satisfaction with all aspects of program progress and SSC San Diego program support, and approved recommended plans for OSPSS updates both onboard HMS SCOTT and at the UK Hydrographic Office.

In October, Center engineers conducted the dockside phase of the OSPSS 2007 update aboard HMS SCOTT. In November, Center personnel and contractors operationally tested and evaluated the updated OSPSS. At the conclusion of the test period, OSPSS Update 2007 accomplishments were reviewed at the annual OSPSS Working Group Meeting. Updates planned for OSPSS Update 2008 and beyond were further defined as part of the ongoing life-cycle support plan for the UK OSPSS. Briefs describing all work accomplished during the 2007 update period, results of OSPSS performance during the sea trial, and OSPSS hardware/software updates planned for during 2008 were presented. Planned fiscal procurements and installation milestones for updates to the OSPSS onboard HMS SCOTT and the Data Refinement System at the UK Hydrographic Office out to Fiscal Year 2015 were also briefed. SSC San Diego proposals for future OSPSS updates were approved by UK representatives.

NAVY MARINE MAMMAL PROGRAM (MMP)[38]

Note: Accomplishments described here occurred in CY 2006.

A first line of defense in the event of a fuel/oil spill that can threaten Navy Marine Mammal Program (MMP) dolphins and sea lions is now in place and ready for immediate deployment if required. Cooperation between the SSC San Diego Environmental Support Group and Navy Region Southwest Port Operations resulted in the acquisition of over 1500 feet of oil spill booms.

A full-scale practice deployment session was conducted 7 December 2006. Conducted with the intent of familiarizing MMP personnel with the deployment process, the drill mimicked a small spill coming from Shelter Island toward Pier 159 dolphin enclosures. The successful drill was conducted in less than 10 minutes.

In addition to the booms, Port Operations provided a trailer in which to house the quick-response booms Bayside. Booms in this trailer will be deployed during fuel/oil spills, as needed, to protect marine mammals from spillage inbound from Scripps Pier, Shelter Island, or leaking vessels.

COMMAND AND CONTROL

BALLISTIC MISSILE DEFENSE SYSTEM (BMDS) TEST BED[39]

The SSC San Diego's Ballistic Missile Defense System (BMDS) Test Bed, San Diego (BTS) team provides support to Missile Defense Agency (MDA) and Aegis Ballistic Missile Defense (BMD). As a key test node for BMD, the BTS has provided service to the MDA and Aegis BMD ships during multiple missions test and evaluation (T&E) and operational events.

The BTS team has supported development of the BMDS downlink capability for Aegis BMD link data since 2003. The test bed team supports all West Coast long-range surveillance and tracking events and continues to play a key role for Aegis BMD ship installation and check-outs. The team brings together various laboratories in support of Block 04 development and test execution.

SSC San Diego support during 2007 included the following:

- **Glory Trip 193 Overview Brief**[40] – Supported Glory Trip 193 test results overview brief to Lt Gen Obering on 20 February 2007. The Aegis BMD Program Office briefed the successes of the GT-193 event and stated that the SPAWAR BTS was crucial as a test element in providing data update requests normally assigned to the Ground-Based Midcourse Defense (GMD) Regional site in Hawaii.
- **Flight Test Experiment (FTX-02)**[41] – Supported FTX-02 (Determined Sentinel-1) mission using the BTS. FTX-02 marked the first successful at-sea demonstration of the Launch-on-TADIL (LoT) capability of the Aegis BMD System. The event highlighted SPAWAR's Next-Generation Command and Control Processor (NGC2P) Joint Range Extension capability onboard each Aegis ship by sending High Speed Tactical Data via Satellite TADIL J and Multicast TADIL J data from the ship using extremely high-frequency (EHF) and ultra high-frequency (UHF) satellite communication systems.
- **Commander, Task Force (CTF)-70 BMD Exercise**[42] – Supported CTF-70 and forward-deployed Aegis BMD ships USS *Shiloh* (CG 67) and USS *Stethem* (DDG 63) during an at-sea BMD Exercise in the Sea of Japan. SSC San Diego provided training and exercise execution support for Aegis BMD multi-link operations using Common Data Link Management System version 3.4. This BMD event supported EHF communications planning, Time-Division Multiple-Access Interface Processor planning, and shipboard EHF training for both ships.
- **Flight Test Terminal High Altitude Area Defense (THAAD) (FTT-07)**[43] – Supported FTT-07 mission execution. The test involved the successful intercept of a "mid endo-atmospheric" (inside earth's atmosphere) unitary (non-separating) target representing a "SCUD"-type ballistic missile launched from a mobile platform positioned off Kauai in the Pacific Ocean.
- **Intercept Flight Test**[44] – Supported Flight Test Mission (FTM)-11 Event #4 "hit to kill" intercept flight test. The test involved the simultaneous engagements of a ballistic missile "unitary" target and a surrogate hostile air target. The test marked the eighth successful intercept in 10 flight tests for the BMD Program.
- **Stellar Athena FTM-12 Event 3 Mission Day**[45] – Supported FTM-12 Event 3 Mission Day, which consisted of a live SM-3 Blk IA engagement from the BMD 3.6 destroyer against a Mid-Range Target (FTM-12). This was the first-ever engagement of a BMD Aegis DDG. The BTS acted as the interoperability hub for FTM-12 Event 3 with full tactical data link and video connectivity.
- **Satellite Tactical Data Link-Joint (TDL-J) (STJ) with Japanese Ship (JS)** *Kongo*[46] – Supported execution of a Systems Integration Test (SIT) for Japan Maritime Self-Defense Force

(JMSDF) Ship JS *Kongo*. The JS *Kongo* SIT conducted with the BTS was a significant milestone; it marked the first allied country to send/receive data over STJ and supports deployment of a sea based BMD capability for JMSDF.

- **BMD Test Event FTG-03a**[47] – Supported BMD test event FTG-03a, providing interoperability support and situational awareness to the on-site Navy Test Officer. The team also supported the Quick Look Brief to MDA Director Lt Gen Obering with Aegis BMD principals via video teleconference 22 September 2007.
- **Flight Test Missile (FTM-13) Mission Day**[48] – Supported FTM-13 Stellar Gryphon Mission Day at the BTS/Combined Test Bed. FTM-13 was the first multiple-target BMD engagement. This mission marked the first time the SPAWAR BMDS Team supported two missions simultaneously (FTM-13 and GTD-02 [distributed ground test]) using both BTS #1 and BTS #2. The lab configured and maintained 12 voice and data circuits during both events. BTS#1 also had video/audio feed from the range, providing real-time situation awareness.

GCCS-M 4.X WATERSPACE MANAGEMENT[49]

The Global Command and Control System-Maritime (GCCS-M) 4.X WaterSpace Management (WSM) software was determined ready for use by the Fleet. The WSM segment of GCCS-M is used by submarine operational authorities to help avoid collisions between friendly forces and to plan submarine operations. The WSM segment is also used to assist in undersea warfare and anti-submarine warfare planning. The initial GCCS-M 4.X WSM segment was removed from the original baseline after failing the 4.0 operational test in 2004 and a verification of deficiencies in 2005. The Fleet returned to using the 3.X version of GCCS-M WSM.

In 2005, SSC San Diego assembled a team of industry partners to transition the WSM product, including Syzygy Technologies, SAIC, and Northrop Grumman. The team referenced the original fleet requirements capability letter issued in 2001, and then visited each Submarine Operational Authority (SUBOPAUTH) in Norfolk, Virginia; Pear Harbor, Hawaii; Naples, Italy; and Yokosuka, Japan.

A list of 214 requirements was gathered and prioritized by each SUBOPAUTH. In December 2005, it was determined that the list of 214 requirements could not be satisfied with the allotted resources, and the list was negotiated with the fleet representatives down to 150 items.

As part of the risk mitigation plan for the transition from 3.X to 4.X, several fleet participation events were planned. These events built confidence that the program was actually addressing the Fleet's needs, and ensured that development was on schedule. During the engineering evaluations/ demonstrations, the Fleet became more familiar with the product and several emergent requirements were identified; these requirements were addressed and solutions incorporated.

The final engineering evaluation/demonstration was held in April 2007 and included representatives from all SUBOPAUTHs. During this evaluation, the fleet representatives indicated that the product was ready for transition and requested installation as soon as possible.

JOINT MISSION PLANNING SYSTEM[50]

Note: Accomplishments described here occurred in CY 2006.

The Enterprise Carrier Strike Group, with Carrier Air Wing One (CVW-1), completed a 6-month deployment in support of the U.S. Fifth, Sixth, and Seventh Fleet areas of responsibility. The mission planning system CVW-1 used to project naval aviation power was a new computer system called the Joint Mission Planning System (JMPS). JMPS was fielded in 2006 by the Joint Mission Planning

Support Office. CVW-1 was the first carrier air wing to deploy with six fixed-wing squadrons using JMPS.

The Enterprise Strike Group conducted combat operations for nearly 2 months in support of the War on Terror, Operation Iraqi Freedom, Enduring Freedom, and Operation Medusa. CVW-1 flew nearly 23,000 hours, including nearly 12,000 hours of combat missions. JMPS was used by CVW-1 aircrews while in the Fifth Fleet area of responsibility to plan missions ranging from electronic attack, airborne early warning, precision attack, and refueling to close air support with strafing runs using the Hornet's M61A1 20-millimeter Gatling gun against Taliban extremists and Taliban weapon fortifications.

Transition of CVW-1 began 3 years prior to its actual fleet introduction. The logistics team conducted a reliability-centered maintenance analysis and prepared five separate 'pack-up kits' of spare parts based upon anticipated operational employment and environment. The logistics team also acquired over $2.3 million worth of computer systems and ancillary parts for JMPS to operate.

SSC San Diego personnel fielded JMPS in February and March 2006 to five strike groups: the Thunderbolts (VMFA-251), Rooks (VAQ-137), Checkmates (VFA-211), the Sidewinders (VFA-86), and the Knighthawks (VFA-136). JMPS replaced the legacy mission planning computer system, Tactical Automated Mission Planning System (TAMPS). SSC San Diego had previously fielded JMPS for the "Maulers" of Sea Control Squadron (VS-32) (October 2005), and the "Screwtops" of Airborne Early Warning Squadron (VAW-123) (May 2005).

Over 23 user manuals were developed for the various JMPS configurations and unique planning components. SSC San Diego developed the lesson plans, training media, and student guides, and conducted JMPS fleet transition training for each of the air wing's squadrons. The Center also created the software loading methodology to install the separate mission planning elements required by JMPS U.S. and foreign military allies, cutting the software load process from over 5 hours to just over 1 hour.

JMPS provides a scaleable mission planning system that can be tailored by the aircrew and deployed on a variety of computer hardware. It allows mission planners to set aircraft defaults, aircraft communications channels/networks, navigation data, plan weapon loads, and precision attacks. In addition, JMPS also calculates aircraft timing, magnetic headings, and fuel requirements for forecast winds and temperatures to successfully complete a sortie. JMPS supports collaborative planning of all mission elements, including attack; airborne early warning; command, control and communications; electronic support; reconnaissance; aerial refueling; and search and rescue. JMPS is a vast improvement over the Unix-based TAMPS it replaces in terms of speed of mission planning, sharing of route and planning data among the squadrons, and the ease of use of the system and portability.

JOINT INTERFACE CONTROL OFFICER SUPPORT SYSTEM[51]

Note: Accomplishments described here occurred in 2006.

The Integration Test and Evaluation Branch teamed with the 46th Test Squadron (Eglin Air Force Base, Florida) and the Marine Corps Tactical System Support Activity (Camp Pendleton) to successfully conduct the first of two developmental tests (DT-I) on the Joint Interface Control Officer (JICO) Support System (JSS). The JSS is an automated, network-centric tool set and information repository. It supports the JICO in planning, management, and execution of the multi-tactical data link (TDL) network (MTN)/multi-TDL architecture (MTA). JSS also supports information management including data from allied and/or coalition entities as appropriate. JSS consists of a baseline of common modular hardware, software, computer operating system, documentation, training, and local and remote JICO data repositories.

Tactical data links such as Link-4A, Link-11, and Link-16 have become increasingly complicated since their introduction in the 1950s. Current TDL management requires highly skilled individuals supported by automated management tools. The JICO JSS concept has been developed and defined through more than a decade of TDL management experience.

The MTA is the physical configuration, functional organization, and operational procedures used in the design, establishment, modification, and operation of the MTN. The MTN is a primary contributor to the Joint Data Network's (JDN) production of the common tactical picture enhancing the Joint Force Commander's ability to conduct war operations. The officer responsible for planning and managing the MTN portion of the JDN is the JICO. The JSS will provide the functionality to allow the JICO to plan, monitor, manage, and perform network analysis and correction to the MTN. The JSS provides the same level of functionality for the JICO regardless of service affiliation.

JSS will provide flexible and scalable voice and data communication systems for the highest level of required functionality. Adaptive packaging will allow a deployable, self-contained, full expeditionary capability (FEC) or a common core capability (CCC) in which the operational facility's communication systems are used to the maximum extent possible. In either FEC or CCC, the JSS will have a distinct presence in the MTN. Distinct presence is defined as an active data link participant (interface unit) on the MTN that is separate and distinct from a host operational facility (OPFAC). The U.S Navy OPFAC would typically be the tactical flag command center or flag plot on large decks (CV/CVN/LHA/LHD).

The JSS initial operational capability is scheduled for the fourth quarter of 2009, and full operational capability should be reached in FY 2011.

JOINT WARNING AND REPORTING NETWORK/JOINT EFFECTS MODEL[52]

The Joint Project Management Information Systems (JPM IS) Test and Evaluation (T&E) Team completed Operational Assessment 2 (OA2) for the Joint Warning and Reporting Network (JWARN)/Joint Effects Model (JEM) programs as they approach their Milestone C decision. Milestone C is the major hurdle for an acquisition program of record to get approval for fielding to the warfighter. JPM IS is the information systems component of the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) Enterprise and is developing three chem-bio programs of record: JWARN, JEM, and the Joint Operational Effects Federation (JOEF). These programs are the cornerstone chemical and biological defense information systems for the Department of Defense.

OA2 involves the end user performing an operational assessment and recommendation for the product to continue moving forward on the Milestone C decision timeline. OA2 is an assessment executed by the operational test community. For a joint program, this assessment includes actual warfighters that have been in recent rotations in-theater and representatives from all services (Army Test and Evaluation Command, Air Force Operational Test and Evaluation Center, Marine Corps Operational Test and Evaluation Activity, U.S. Navy, Commander, Operational Test and Evaluation Force).

OA2 opens the door for the final hurdle, the Multi-Service Operational Test and Evaluation (MOT&E), scheduled in FY 2008. Successful completion of the MOT&E will result in the product being recommended for approval by the Milestone C decision authority.

SENSEMAKING LIMITED OBJECTIVE EXPERIMENT-3[53]

The Center served as the backdrop for a ground-breaking, multinational Limited Objective Experiment (LOE) exploring SenseMaking in the maritime domain. SenseMaking is an approach to situation awareness that enables people, processes, and systems to exploit information under conditions of

complexity, uncertainty, and time pressure. The goals are to gain better understanding and planning; and faster and better decisions against an elusive and adaptive adversary. When provided certain resources under a given set of circumstances, SenseMaking examines how users process information and make decisions accordingly. The resultant task description can be used to guide development of technology, training, and procedures that support human cognitive processes and the refinement of existing systems.

The SenseMaking LOE was a cooperative effort by the U.S. Joint Forces Command (J9), the Singapore Armed Forces, and the NATO Allied Command Transformation (ACT) project team. It was the third (LOE-3) in a series of exercises designed to examine the impact of introducing several information processing and visualization capabilities that support decision making in the maritime domain.

SenseMaking LOE-3 was hosted by the SSC San Diego Intelligence and Information Operations Systems Group, NATO ACT project team. The exercise took place 27-30 August 2007 and brought approximately 20 foreign national visitors to the Center. The main objective of the SenseMaking LOE-3 was to gain insight into human decision-making processes to establish situational awareness in the maritime domain. Experimenters were particularly interested in quantitatively and qualitatively evaluating how, and to what extent, users applied available maritime situational awareness software and Internet resources to identify suspect vessels of interest from an Automatic Identification System feed. The primary service-oriented architectures used in the experiment were NATO's BRITE (Baseline for Rapid Iterative Transformational Experimentation) and Singapore's RAHS (Risk Assessment and Horizontal Scanning). The U.S. Joint Forces Command Starlight visualization tool was incorporated into the experimental architecture to enhance analytical capabilities.

Over the course of 4 days, four test teams were presented with seven distinct scenarios. Each team consisted of a systems expert, an operator and, in some cases, an intelligence analyst. Experimenters varied test team composition to assess how the inclusion of an intelligence analyst impacted the SenseMaking process. Some scenarios ran in a "federated environment" to explore the effects of inter-team collaboration on decision making. Observers closely monitored the experiment from start to finish and developed detailed concept maps for each test group and scenario.

The NATO ACT project team reported that SenseMaking LOE-3 was a success and set the stage for future experimentation and multinational collaboration. The experiment produced a wealth of data for analysis. Lessons learned from the event will form the basis for the fourth spiral of the SenseMaking LOE (LOE-4).

FLEET ENGINEERING

FLEET INSTALLATIONS AND TECHNICAL ASSISTS[54]

In CY 2007, SSC San Diego conducted approximately 1000 C4ISR installations and 500 fleet technical assists.

RF IDENTIFICATION AND ITEM UNIQUE IDENTIFIER TAGS[55]

The Extremely High Frequency (EHF) Satellite Communications Branch succeeded in placing passive Radio Frequency Identification (RFID) and Item Unique Identifier (IUID) tags on 88 percent (approximately 17,500 items) of the Branch's sponsor-owned material. This will reduce yearly costs by decreasing the time required to inventory equipment. Handheld readers used by Branch supply the power source for the passive RFID tag, which is a special radio frequency transmitter. Branch personnel are now researching applications for active RFID tags. Active RFID tags are battery-powered tags capable of continuously transmitting data.

The Department of Defense is dedicated to becoming an early adopter of RFID technology for logistics support to the warfighter through fully automated visibility and asset management. The Branch has taken this approach beyond instituting the mandate by researching, testing, evaluating, and integrating RFID along with IUID information as an identifier for depot-level maintenance. The Branch is also introducing the technology into the supply chain system for shipping, receiving, and maintenance (work orders/requests/technical reports). The Branch is now in the process of reducing the costs of everyday shipping, receiving, and maintenance actions. For example, recording the equipment maintenance actions by technicians while performing the repair or necessary paperwork will save approximately one-quarter to one-half of a man year of labor. Lessons learned are being applied to portable technology that will allow technicians to remotely inventory, tag, and update their configuration management software and send data to the IUID/UID registry from anywhere in the world. This will allow program and project managers to tag their equipment on-site with as little down time as possible.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

AUTONOMOUS UNDERWATER GLIDING VEHICLE (AUGV): TOWED ACOUSTIC ARRAY[56]

SSC San Diego's Acoustic Sensor/Surveillance Team deployed an Autonomous Underwater Gliding Vehicle (AUGV) towing a 110-foot, 16-element, acoustic array as part of the Monterey Bay 2006 (MB06) field experiment. For 9 hours, the glider conducted submerged operations and completed 30 dives to over 70 meters. The towed acoustic array was designed, developed, and integrated by Intelligence, Surveillance, and Reconnaissance Department engineers. It captured both background acoustic data as well as acoustic signals generated from SSC San Diego's towed noise source.

The AUGV, built and manufactured by Web Research Corporation, uses variable buoyancy and waypoint navigation. It is designed to operate in 4- to 200-meter depths. It can be programmed to patrol for weeks at a time, surfacing to transmit data to shore while downloading new instructions at regular intervals.

The 16-element acoustic array was designed and developed by the Advanced Acoustic Research Branch and integrated onto the AUGV with the assistance of Ocean Systems Division Unmanned Maritime Vehicle Laboratory engineers. The array consists of 14 hydrophones and two additional sensor nodes. It was designed to sense acoustic energy in the 20- to 500-Hz range. Acoustic data are sampled 1500 times-per-second and transmitted digitally up the array cable to a recording system in the glider payload bay. The array data recording system is energized using a switch in the tail cone of the glider, and operates independently of the glider control system. After system retrieval, the recorded acoustic data are downloaded to a memory storage device and processed.

The team successfully conducted 2 days of glider operations. The team also deployed, monitored, and retrieved the vertical "kelp" array and towed the Lubell underwater noise source to generate specific acoustic signals for interpretation by SSC San Diego and other research systems.

The MB06 field experiment involved over a dozen research institutions, 13 research vehicles, more than three dozen robotic submarines, and many other fixed and drifting oceanographic instruments. Several SSC San Diego programs are involved, including Adaptive Sampling and Prediction, Assessing the Effects of Submesoscale Ocean Parameterizations, Layered Organization in the Coastal Ocean, and Undersea Persistent Surveillance.

In the near term, the team will receive funding from PMW-180, through the Ocean Bottom Characterization Initiative, to develop a custom array and new glider behaviors that will allow vertical positioning of the array in the water column. Combined with new mathematical algorithms, this system will be able to characterize the ocean seafloor (reflection power loss, bottom depth, sub-bottom reflectors, reverberation, and geoacoustics) using ambient noise (rain and/or waves) and external noise sources.

DATA ACCESSIBILITY ENHANCEMENTS TO SUPPORT SPECIFIC EMITTER IDENTIFICATION (DAESSEI)[57]

The Data Accessibility Enhancements to Support Specific Emitter Identification (DAESSEI) team successfully coordinated and conducted a final demonstration to sponsors from U.S. Special Operations Command, Military Exploitation of Reconnaissance and Intelligence Technology, and Pacific Fleet operators in Pearl Harbor.

DAESSEI is the creation of a prototype network-based, tactical Specific Emitter Identification (SEI) data-sharing capability that simplifies the storage and distribution of SEI data, making the data accessible to the tactical warfighter. The system's multiple synchronized data repositories allow information to be obtained and shared without lengthy database searches. The "publish and subscribe" capabilities provide near real-time delivery of desired data via a network instead of a manual system that requires user action.

The full-scale demonstration involved multiple participants to achieve a real-world simulation. The participants included the following:

- Commander Pacific Fleet N39
- Seal Delivery Vehicle Team One
- Tactical Support Facility, Kaneohe Bay
- U.S. Naval Special Operations Center
- Joint Interagency Task Force West
- U.S. Pacific Command J2
- Joint Intelligence Center
- National Security
- Agency/Central Security Service, Hawaii.

The demonstration consisted of two organic ground-truth collectors (Platform for Privacy Preferences and covert ground-based) injecting post-mission SEI data into a DAESSEI Web page on the Secret Internet Protocol Router Network. Operators at Kaneohe Bay and Special Operations Command, San Diego, monitored the DAESSEI Web Graphical User Interface for the injected data. Once the data were received, operators from both locations called Pacific Command, notifying the other participants and sponsors.

ADVANCED DEPLOYABLE SYSTEM[58]

After years of extraordinary success, the Advanced Deployable System (ADS) program concluded in 2007, having been canceled by the sponsor. The ADS program met all Operational Requirement(s) Document specifications, but the specifications no longer meet Navy antisubmarine warfighting requirements.

The concept of a rapidly deployable surveillance system originated during the ARIADNE project. ARIADNE was a joint Defense Advanced Research Projects Agency (DARPA)/Office of Naval Research (ONR) science and technology initiative. ARIADNE was a vertical line array that initiated development of micro-technology to support a rapidly deployable, distributed undersea system for deep-water, open-ocean surveillance. The ARIADNE project successfully demonstrated the use of small diameter fiber optic (SDFO) cables to connect passive acoustic sensors and optical telemetry that passed raw acoustic data to a collection point for analysis. These key technologies were later employed by the ADS program.

In 1992, the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN RD&A), formally approved entry of the ADS program into Phase 0. ASN RD&A approved ADS Phase I on 21 November 1994. Later that year, the concept and exploration phase of ADS was enhanced by a series of tests that affirmed the feasibility of detecting quiet diesel-electric submarines and mine-laying activities in shallow littoral waters using bottom-mounted arrays. In 1995, the ADS Program Office (PMW-183) was officially established.

From the summer of 1996 through 1998, ADS progress included a series of developmental and increasingly complex system-level tests. These tests focused on the deployment of ADS using a

surface platform towing an underwater array and cable deployment vehicle. The towed deployment vehicle was designed to be towed several meters off the bottom of the ocean by the surface ship while deploying a single strand, four-array system connected via SDFO.

The underwater segment development and testing focused on the sensor and array fabrication, node design, telemetry, and SDFO cable design. Processing and analysis maturity was pursued as a series of builds based on Integrated Undersea Surveillance System (IUSS) experience. The final build supported the 1999 fleet exercise test (FET), a four-string, 16-node sensor field in the Southern California operating area. The FET satisfied specified exit criterion of the Milestone I Acquisition Decision Memorandum (ADM) and proved the rapid installation capability of an ADS field. The ADS program developed the capability to deploy from multiple platforms, terminating both ashore and at-sea. Significant program milestones include the following:

- ADM Milestone (MS) 0, December 1992: Commenced concept exploration phase.
- ADM MS I, November 1994: Signed operational readiness demonstration (ORD) and commenced the preliminary design and risk reduction phase.
- ADM MS II, February 2000: Expanded to multiple deployment platforms to meet barrier and area surveillance requirements.
- November 2003: ORD specifies littoral combat ship deployment as the initial capability to be developed, and all increments to be terminated at-sea as top priority.

SSC San Diego supported ADS development and testing throughout the program. Support included participation in every aspect of development for each subsystem and all phases of system engineering, and proved critical to the success of the program throughout its lifetime. SSC San Diego also provided subject-matter experts to the program office to provide technical and management oversight in the Sensor Subsystem and Installation Subsystem as well as acting as the government lead for all system tests.

COMMUNICATIONS AND INFORMATION SYSTEMS

DIGITAL MODULAR RADIO (DMR)[59]

Note: Accomplishments described here occurred in CY 2006.

The Digital Modular Radio (DMR, or AN/USC-61(C)) Version 6.4 cryptographic certification was approved in December 2006 by the National Security Agency (NSA) Information Assurance Director. DMR is a software-based radio that has the potential to free-up shipboard space by eliminating large banks of radio and cryptographic devices on racks. It is designed to implement the cryptos as software on the radios to effectively replace four radios and their cryptos.

Because it implements software-reprogrammable waveforms on a hardware platform, new waveforms and new cryptos can be implemented without changing the hardware. DMR 6.4 implements the following waveforms in software with embedded cryptography:

- UHF satellite communications
- HF
- Single-channel ground-to-air-radio system
- HAVE QUICK II
- Link 4A and Link 11
- Amplitude modulation/frequency modulation line-of-sight
- Automatic transmission control

DMR was conceptualized in the mid 1990s, and the first development contract was let in 1998. The first operational version in 2004 had less capability than expected, but was certified by NSA and deployed into the Fleet.

HIGH ASSURANCE INTERNET PROTOCOL ENCRYPTION[60]

The High Assurance Internet Protocol Encryption (HAIPE) Team successfully published Interoperability Specification Version 3.0.2 and Version 3.1. HAIPE is a Commercial Communications Security Evaluation Program effort sponsored by the NSA. It is the encryption device of choice for the Global Information Grid. The HAIPE team's efforts focus on the interoperability of HAIPE devices across networks, services, and coalition partners.

Version 3.0.2 and Version 3.1 marked the fourteenth and fifteenth on-schedule deliveries of documentation. The HAIPE software development team members delivered two versions of the HAIPE Interoperability Tool: Foreign Interoperability and Version 3.0.2. The HAIPE Validation Team members performed compliance testing for 14 products and vendor-to-vendor testing on 58 different HAIPE combinations. In addition, the HAIPE team trained approximately 100 Department of Defense personnel.

TSG TACTICAL SATELLITE (TACSAT) SYSTEM[61]

Note: This accomplishment occurred in CY 2006.

The Tactical Shore Gateway (TSG) team supported Joint Task Force (JTF)-116 mission control during the Space Shuttle Discovery's mission STS-116. The TSG team developed a naval communication system especially adapted to provide an expanded search and rescue (SAR) communications capability

for the National Aeronautics and Space Administration (NASA), known as the TSG Tactical Satellite (TACSAT) system.

TSG TACSAT allows real-time voice communications with SAR resources far beyond the restrictions typical of line-of-sight radio communications that are often limited to only 30 miles. This ensures a capability to coordinate medical or other support required by SAR personnel regardless of geographic location.

Space Shuttle Discovery's STS-116 mission was flown to support the International Space Station (ISS) and its expedition of 14 personnel. The shuttle's primary goals were to deliver and attach a major structural element (third port truss segment), support a major rewiring effort to the station's power system, and allow the exchange of ISS crew members.

The TSG team configured, established, and maintained the necessary TSG TACSAT and SAR communications links well before the shuttle's launch on 9 December 2006. Once the shuttle reached orbit, TSG team members remained on call throughout its entire flight, returning to man the TSG TACSAT SAR circuit 24 hours prior to the shuttle's re-entry, affirming and verifying communications availability for NASA and JTF mission control. The TSG team initially supported STS-115 as a proof of concept, but after the STS-116 success, the team has been asked to continue support of future NASA missions.

DDG 1000 HF ANTENNAS [62]

The SSC San Diego-led effort to develop HF transmit and receive antennas for the DDG 1000 program has successfully completed two major milestones:

- HF antenna performance testing was successfully completed on 5 October 2007. Preliminary analysis of the HF Transmit (Tx) test results shows that the antenna complies with performance requirements for impedance, efficiency, power handling, and intermodulation. Preliminary analysis of the HF Receive (Rx) test results shows that the antenna complies with performance requirements for impedance, efficiency, and sensitivity. Both antennas were used to successfully perform communication link testing.
- HF antenna radar cross section testing was completed successfully on 3 November 2007. Preliminary analysis of the HF Tx test results shows that the antenna and transitions comply with updated performance requirements. Preliminary analysis of the HF Rx test results shows that the antenna and field-modified transitions comply with updated performance requirements. The field-modified HF Rx transition design needs to be productized. These are the first antennas to be tested in a shipboard representative configuration.

ADVANCED DIGITAL NETWORK SYSTEM (ADNS) INCREMENT IIA PIERS UPGRADE[63]

The Advanced Digital Network System (ADNS) Increment IIA Piers Upgrade Systems Operational Verification Test was performed at both Naval Computer and Telecommunications Area Master Station Pacific (NCTAMS PAC) and onboard USS *Ronald Reagan* (CVN 76) the week of 11 November 2007. The Increment IIA Piers Upgrade, designed jointly by engineers from ADNS and Base Level Information Infrastructure-Piers, provides ADNS Increment IIA ships with 10 Mbps bandwidth while the ship is pier-side. The Piers Upgrade provides the following benefits to ADNS Increment IIA ships:

- Significant increase in bandwidth, from 1.5 Mbps or 2-3 Mbps provided by current shipboard pier interface systems.
- Same shipboard network topology while ship is pier-side and while underway.

- Allows pier-side Increment IIA ships to turn off RF satellite communications (SATCOM) assets, increasing SATCOM bandwidth available for ships deployed at sea.
- Allows Increment IIA ships to access a variety of applications that were only available while the ship was using SATCOM resources, such as real time jitter-sensitive applications (Voice over Internet Protocol and Circuit Emulation of legacy serial applications) and tactical applications that require large data transfers.
- Pier-side upgrade implements ADNS Quality of Service mechanisms to allow minimum bandwidth guarantees to security enclaves, dynamic bandwidth sharing between security enclaves, and application prioritization.

All Increment IIA ships are scheduled to receive the IIA Piers Upgrade. The next installation is scheduled for USS *George Washington* (CVN 73) and NCTAMS Atlantic in mid January 2008.

APPENDIX A: CY 2007 ACHIEVEMENT AWARDS

NAVY AWARDS

Department of the Navy Top Scientists and Engineers Program[64]

Assistant Secretary of the Navy for Research, Development, and Acquisition selected six Center researchers for the Department of the Navy Top Scientists and Engineers Program 2006. Dr. Roy Axford and Jeff Waters were selected in the category of "Top Scientists," and Michael Thorpe, Estrellina Pacis, Dr. Richard Waters, and Dr. Joe Neff were selected in the "Top Emerging Investigators" category. The program was established to recognize Navy military and civilian scientists and engineers for significant achievements during the preceding calendar year. Awardees demonstrated research projects that established a scientific basis for subsequent technical improvements of military importance, materially improved the Navy's technical capability, and materially contributed to the national defense.

Dr. Roy Axford, Radio Frequency Communications Systems, Technical Staff

Dr. Axford led a team of engineers in completing interoperability and communications performance testing of the payload-engineering model for the Block 1 satellites of the Wideband Global SATCOM (WGS) program. The testing introduced an unprecedented approach to satellite communication performance verification and proved crucial in exposing a major design flaw that would have prevented successful satellite deployment. WGS is an integral part of the DoD future military satellite communications architecture. It will provide 1.2 to 3.6 gigabits-per-second of capacity per satellite, which is at least a six-fold increase over the predecessor program, the Defense Satellite Communications System.

With a unique and innovative approach to payload testing using specialized hardware and software, Dr. Axford and his team proved that the WGS synthesized reference generators would require design improvements to meet the threshold capacity performance. Team members worked with the WGS program office and the prime contractor to identify possible solutions and provide verification that the new design met the performance mandated by the operational requirements document. Dr. Axford produced an extensive report documenting the test procedures and results, a theoretical explanation of the WGS payload problem, and recommendations for avoiding the problem in future satellite programs. The test results will be included in a planning document for WGS operators that will provide estimates of implementation loss for various payload configurations and end-user communications waveforms.

Each WGS satellite costs approximately $350 million to procure and launch, and Dr. Axford's successful completion and documentation of the testing provided DoD with the assurance to proceed. The WGS satellite will offer greater capability to U.S. warfighters, allies, and coalition partners during all levels of conflict. Dr. Axford is now applying his knowledge and expertise to other communications satellite programs, including the Navy's Mobile User Objective System.

Jeff Waters, Language and Intelligence Systems Advanced Technologies

Jeff Waters was recognized for his leadership and innovation in redesigning and implementing the Knowledge Web (Kweb) concept. Kweb is a real-time, Web-based, situational awareness capability that can operate across multiple projects and command centers. Waters' team re-evaluated the Kweb,

currently operating as a perpetual briefing capability aboard USS *Carl Vinson* (CVN 70). Waters and his team redesigned the Kweb for multiple user input, a more responsive interface, and an extreme ease of use tailored to optimize user assessments. The design was brought to life at National Security Agency/Central Security Service Hawaii where it serves as the primary situational awareness tool for morning briefings and watch floor stand-ups and pass-downs.

Waters extended Kweb concepts, designs, and prototype capabilities in support of multiple projects in 2006 including the Border and Transportation Security Network, the Department of Homeland Security's National Operations Center, and a design for coalition use by the Combined Joint Task Force – Horn of Africa.

Michael Thorpe, Special Projects and Surveillance Systems Branch

New Professional Michael Thorpe is the engineering lead for the Recon Adaptive Patrol Tactical Robotic Sentry (RAPTRS) system prototype. RAPTRS is an unmanned ground vehicle system with an intelligent sensor payload capable of detecting and classifying intruders entering Navy-controlled locations. Feedback from Navy users validates its usefulness in autonomous, roaming, sentry patrol.

The RAPTRS prototype incorporates control software and sensor integration with commercial off-the-shelf technology. The control software allows users to move the vehicle and detection package semi-autonomously using Global Positioning System (GPS) recorded paths. The vehicle uses designated, pre-planned routes or is teleoperated by a joystick at the command and control station. The sensors onboard the RAPTRS are integrated into a service-oriented architecture to correlate and integrate real-time surveillance images into a comprehensive operational view of an area. Field-tested at the Naval Air Depot, North Island, RAPTRS has undergone military usability assessment. It is planned to undergo additional field testing at Naval Surface Warfare Center, Crane, for potential permanent installation.

Thorpe is currently incorporating full autonomy, video differencing, and inertial navigation into the already intelligent, high-tech package. Full autonomy will allow the vehicle to use onboard sensors and programming algorithms to dynamically alter its course and choose an optimal path to its generated alert location. Video differencing software alerts the user to anomalies in the terrain, fencing, or new objects/obstructions in its path that might pose a disabling threat to the vehicle. Inertial navigation replaces the GPS system for an enhanced navigational capability that will also minimize the potential spoofing or jamming of GPS radio frequencies. It will provide organic positional references instead of relying on external sources.

Estrellina Pacis, Unmanned Systems Branch

Estrellina Pacis heads up a focused effort to increase the functionality and autonomy of the man-portable robot. Her three goals are to harvest and exploit existing technologies; integrate and optimize these technologies to support validated user requirements; and provide a delivery schedule for users that will increase their technology readiness levels.

Pacis secured funding from the Office of the Secretary of Defense (OSD) to transition existing technology, with an initial emphasis on participants of the Defense Advanced Research Projects Agency Tactical Mobile Robot program. She assembled a team from the robotic science and technology community with the same objectives to share resources and expedite the maturity levels of the most promising research and development efforts.

Pacis established a Memorandum of Agreement with the Idaho National Laboratory of the Department of Energy and tasked them to oversee the integration and optimization of efforts such as the Simultaneous Localization and Mapping Algorithms developed by Stanford Research Institute

International. By collecting user feedback, she determined the nature and priority of desired upgrades to the baseline systems employed in-theatre. She petitioned the Center for Commercialization of Advanced Technology to sponsor a solicitation for direct support of these upgrades that resulted in eight contract awards. A parallel arrangement was made with the Hawaii Technology Development Venture resulting in two additional contracts. She fostered tech-transition ties with three OSD Mentor-Protege efforts, and one Small Business Innovative Research program. Four Cooperative Research and Development Agreements are in progress.

Through harvesting existing technology, the Autonomous Robot Mapping System was developed to perform a mission with no human oversight or continuous communication link to the operator. Man-portable robots can now enter an unknown space such as a congested urban environment, bunker, or cave; explore and map its full extents; stay referenced in that map; and then return to the starting point. Efforts are underway to instantiate this autonomous capability on the two commercial platforms selected for in-theatre support: the Foster-Miller Talon and the iRobot PackBot. The Marine Corps will evaluate the baseline capability during fall of 2007, followed by operational testing in-theatre.

Future upgrades will equip the system to detect various items of tactical significance within the area of exploration such as explosive residue, chemical contamination, radiation levels, human presence, and weapons. The system will then encode such information into a virtual map.

Dr. Richard Waters, Advanced Integrated Circuits and Sensors Branch

Dr. Waters is the lead investigator for an optically based Micro-Electro-Mechanical System (MEMS) technology that can be applied to a variety of defense-related problems. He innovated a means of using light to sense the ultra-small movement of MEMS components instead of measuring changes in capacitance, as in the prior state-of-the-art. By fabricating a Fabry-Perot interferometer on a MEMS scale, Dr. Waters was able to overcome the limitations of earlier capacitance sensing methods and increase the sensitivity of his devices, while maintaining a very small size and low-power operation. This breakthrough in MEMS technology will enable development of advanced inertial sensors and chemical detectors with higher performance than anything available on the MEMS scale.

Optical MEMS technology was originally applied to the detection of acceleration, an inertial measurement critical to navigation systems. The measured sensitivity of his new optical accelerometer exceeded by three orders of magnitude the previous record for displacement sensitivity. This extreme sensitivity requires that active feedback techniques be developed and employed to extend the dynamic range, improve the signal-to-noise ratio, and prevent saturation of the accelerometer. In 2006, these active feedback techniques were successfully demonstrated in hardware by the MEMS team.

Dr. Waters' MEMS technology can be applied to other defense requirements. The first device he developed, the accelerometer, is essentially an ultra-sensitive detector of displacement. By altering the design and utilizing the Coriolis force, Dr. Waters was able to design an optical gyroscope with the operating principle of an ultra-sensitive Fabry-Perot interferometer. These advanced, ultra-small gyroscopes entered into prototype fabrication in 2006.

Using a combination of such accelerometers and gyroscopes, complete inertial measurement units can be fabricated that might one day provide a smart projectile or unmanned aerial vehicle with the navigation precision found in an F-18 today. Another application of his technology, a MEMS-based optical spectrometer, is an ultra-small chemical sensor that will enable small, ultra-portable sensors of chemical and biological agents for the foot soldier.

Dr. Joe Neff, Applied Research Branch

Dr. Neff has developed novel electronic and microelectronic circuits for use in sensor and robotic systems. Dr. Neff led a team to develop a custom integrated circuit (IC) for use in an integrated magnetic field sensor known as a fluxgate magnetometer. The IC provided significant size reduction of the integrated sensor by reducing the number of electronic parts. Early versions of the support electronics occupied a circuit board approximately 6 square inches. The custom IC circuit board is approximately 1 square inch.

A considerable power savings was achieved by reducing the complexity of the system and the operating voltage of the electronics. The next version of the sensor will include a single chip solution that will consist of a system on a chip that includes a microcontroller as well as the sensor interface. The entire system is anticipated to be the size of a pencil with a sensitivity that is better than 500 picotesla. The Marine Corps is testing this device for a variety of unattended ground sensor applications.

Dr. Neff established a strong collaborative environment between the Jet Propulsion Laboratory and the Center to develop self-reconfigurable electronics for operating in extreme environments. Dr. Neff developed a novel reconfigurable architecture based on floating-gate transistors and novel bistable circuits that form a new paradigm for performing computation. These novel circuits have been used to demonstrate extremely compact pattern generating circuits for use in robotic and communication systems.

Navy Meritorious Civilian Service Awards[65]

Scott Adams leads a multi-organizational team that is developing the Unmanned Surface Vehicle Towed Array System for the Littoral Combat Ship Antisubmarine Warfare mission package.

Amalia Barrios is widely recognized for her work on modeling atmospheric effects on electromagnetic wave propagation. She is a major contributor to the Advanced Refractive Effects Prediction System.

Roland Bloomfield is the project manager for the Hostile Force Integrated Targeting Service and lead engineer for the Airborne Networking effort.

Dr. Pamela Boss experimented with low-energy nuclear reactions. She reported breakthrough evidence that paves the way for additional research to develop low-energy nuclear reactions as a clean alternative energy source.

Frank Calantropio develops new business opportunities for his group and is actively involved in the First Line Supervisor Integrated Product Team, the Information Technology Steering Group, and the Information Technology Standards Guide Design for Lean Six Sigma.

Adrian Deal has become one of the Naval Inventory Control Point's top-performing logistics partners. He helped improve the workload forecast accuracy rate to an unprecedented 95 percent.

Christina Deckard teamed with the Joint Non-Lethal Weapons Directorate to investigate new technologies. She directs development, test, evaluation, installation, and maintenance vital to current laser intelligence systems.

Deborah Dondero manages the High Assurance Platform project, a new National Security Agency project critical to future information assurance policies and practices.

Colleen Dorin provides financial management for the Tactical Systems Integration and Interoperability Division. She serves as assistant project manager for many of the division's projects.

Marcus Fieger supports Operational Assessment Number 2 for the Joint Warning and Reporting Network and Joint Effects Model programs as they approach their Milestone C decision.

George Galdorisi develops and facilitates Center leadership forums and effectively articulates the Center's vision and technological contributions.

Kenneth Garcia created a world-class C4I technical training resource bringing the best available technologies and processes to Navy training as director of the SPAWAR Institute.

Ronald Gauthier returned from his second overseas assignment in Bahrain where he served as Navy Research Science Advisor for Commander, U.S. Naval Forces Central Command; U.S. Fifth Fleet; and Combined Forces Maritime Component Command.

Michael Herring developed the Modular Adaptive Recognition System and helped provide 13 government-furnished software applications that were fully integrated into the Cooperative Outboard Logistics Upgrade system architecture.

Emil Klawitter developed new methods for testing, reporting, and tracking systems to meet the requirements of the DoD Information Certification and Accreditation Process Guidance Instruction.

Michael Long supported the recent National Defense Industrial Association Conference as security manager for the event.

Alfredo Lopez corrected a problem aboard USS *Ronald Reagan* (CVN 76) enabling it to distribute real-time navigation information to shipboard weapon systems and combat support systems.

Jeffrey Mah leads the SSC San Diego team that addresses classified National Geospatial-Intelligence Agency external communications requirements.

John Murphy is chief radio frequency engineer for the Psychological Operations program.

Kevin Nuibe contributed significantly to numerous projects involving satellite and terrestrial communications, and is working with the National Security Council on the White House Situation Room networking program.

Jeffrey Quy completed the Tactical Switching Program systems integration and interoperability test bed. He has been instrumental in the successful completion of test and evaluation program milestones for the Navy Teleport Program and the Ballistic Missile Defense System initiative.

Steven Roa provides extraordinary technical and management leadership for the Maritime Global Command and Control System family of systems project.

Jeffrey Schnitzer is deputy program manager for two Special Operations Command programs that form the Special Operations Forces network infrastructure.

Kelly Sobon led her team to enhance Link-16 Dynamic Network Management resulting in solutions that operational forces are using in the Global War on Terror.

John Stonebraker leads a team of 30 government and industry personnel supporting development of V-22 Osprey Program Office technical publications and integrated logistics products.

Jimmy Cheng developed important Theater Security Cooperation operations capabilities for U.S. Army Pacific.

Steven Hugueley developed and installed the Swimmer Interdiction System at Naval Submarine Base, Kings Bay, Georgia. His work is crucial to meeting harbor security capabilities at the base.

Wayne Morinaga is aggressively pursuing a new Indefinite-Delivery/Indefinite-Quantity contract to handle the requirements of the division's projects.

Jay Sakai oversaw upgrades to the Fleet Command Center and the Flagship Makalapa compound. He acted as lead engineer to configure the flight control computer and flight schedule monitor for major joint exercises.

Arleen Simbulan successfully briefed the House Appropriations and the Senate Arms Committees on Integrated Shipboard Network System program budgetary accounting.

Andrew Smith provided expertise in the design and evaluation of Virginia-Class submarine networks.

James Southerland supported U.S. Joint Forces Command as the deputy program manager for the Homeland Security Command and Control Advanced Concept Technical Demonstration; and as deputy system engineer to support Joint Battle Management command and control.

David Stevens ensured that Center requirements were met for the delivery of Navy Marine Corps Intranet (NMCI) services to technically refresh NMCI seats and migrate legacy networks into NMCI.

Abby Westerman served as subject matter expert and program manager for several high-profile national defense programs ranging from advanced research and development to transitioned operational systems.

SPAWAR LIGHTNING BOLT AWARDS[66]

SPAWAR Standard Report Initiative Team

The SPAWAR Standard Report Initiative Team enhanced efficiency and effectiveness through the development of a standardized format and automated data collection methodology. During FY 2006 the cost data, contract actions, and Echelon III funding documents were collected for approximately 3000 individual tasks citing over $916 million. This reporting process consolidates cost analysis reports within SPAWAR Headquarters and the PEOs and eliminates time-consuming practices of financial status reporting.

SSC San Diego team members included David Bly, Kathy Mclane, Jovanna Henry, Joseph Weber, and Mel McArthur.

Joint Interagency Task Force South Team

The Joint Interagency Task Force South Team improved the quantity and quality of all-source intelligence support to deployed forces throughout Latin America and partner nations. These forces seized or disrupted 252 metric tons of cocaine, 7 metric tons of marijuana, and 8059 grams of heroin, preventing $5 billion worth of drugs from reaching the U.S. Beyond the counter narco-terrorist arena, this team integrated counterterrorist efforts and homeland defense issues into its mission and offered critical assistance in the defense against international terrorism directed at the U.S. and its interests abroad.

SSC San Diego team members included Gary Alexander, Alan Case, Jack Godwin, Lisa Gutierrez, Serena Lee, Alan Lockwood, Keith Reel, Fredric Scali, David Slade, Richard Swen, Loi Truong, and Nghia Vu.

SPAWAR Ballistic Missile Defense System Team

The SPAWAR Ballistic Missile Defense System Team supported Aegis Ballistic Missile Defense and the Missile Defense Agency in a successful intercept of a target ballistic missile off the coast of Kauai, Hawaii. Flight Test Mission-10 of the Stellar Predator Campaign was a C4I mission that required significant teaming to achieve an unprecedented collaboration of people and labs for planning and execution.

SSC San Diego team members included Marlow Fitzgerald, Ruben Garcia, Mark Pasley, Timothy Altbaum, Colleen Dorin, Lisa Dumin, Siobhan Bowen, Xavier Vargas, David Roth, OSC Scott Hunnicutt, Domingo Garcia, Roger Ford, Richard Rubio, Debra Huntingford, Sam Vance, Eric

Hooper, Jeff Dodrill, Eric Scrimpsher, Luis Biaggi, Mitchell Gillette, Chew Hom, Michael Gonzales, Randall Smith, Vivian Chu, James Hlava, Eric Rupert, Ellen Ward, Manuel Silveira, Gary Nowicki, Dean Willis, Daniel Lavarier, Jody Jordan, Tom Wing, Timothy Aston, Donald Elmore, Grace Massamiri, Rodney Merrill, Bill Finan, Paula Riddle, Margaret Robbie, Chris Horne, Joyce Agustin, Michael Lee, Michael Jackson, Alexander Ureta, Robert Calland, Jeffrey Quy, Douglas Bui, Vu Hoang, Antonio Esteban, Jacquelyn Vu, Michael Lovern, George Evanoff, Robert Vik, John McCarthy, David Pacifico, Bruce Wahlen, Thomas Donnelly, Michael Ryan, John Hunt, Leslie White, Rick Hyatte, Patrick Garcia, Joseph Summa, Mark Bonslaver, Jane Campbell, and Samuel Modica.

Sea Fighter C4I Integration and Test Team

The PMW 760 Sea Fighter C4I Integration and Test Team integrated and tested the Sea Fighter C4I suite by coordinating with representatives across Team SPAWAR. These efforts ensured that Sea Fighter deployed with critical satellite communications and ultrahigh frequency line-of-sight communication systems, classified and unclassified e-mail communications, local-area networks, and tactical situational awareness for its inaugural Rim of the Pacific deployment.

SSC San Diego team members included Mark Blocksom, Jeff Wildasin, Mark Cooper, Arleen Simbulan, Carlos Rosado, Ernest Rauhauser, Analiza Lozano, Kay Myers, Gleason Snashall, and Nathan Wheeler.

CV 63 Integrated Shipboard Networks System (ISNS)/GIGabit Ethernet Local Area Network Planning, Design, and Installation Team

The CV 63 ISNS/GIGabit Ethernet team implemented the ISNS/GIGabit Ethernet upgrade onboard USS *Kitty Hawk* (CV 63). Working as a single integrated unit, the team overcame numerous challenges during the installation, coordination, and implementation process to deliver essential C4I, surveillance, and reconnaissance capabilities ahead of schedule and with quality results.

SSC San Diego team members included Thomas Mills, Eduardo Flores, Jay Barlis, John Sommers, Yuuji Matsumoto, Yoshiaki Suzuki, Shin Ooi, Susan Pierce, Eiko Tomita, Louis Gates, Alan Godwin, Ralph Robertson, Brian Coffelt, Will Mallet, Jay Campbell, Phillip Baptiste, Vinh Huynh, Mike Mahoney, Robert Diaz, Minh Nguyen, Roman Covarrubias, Dennis Lovingood, Richard Orchard, Cheryll Carter, Roderick Frillot, Matt Tuttle, Asako Sueki, and Yasunobu Nagashima.

Joint Mission Planning Support Team

The Joint Mission Planning Support Team enabled the seamless transition of the Navy and Marine Corps fleet of FA-18 aircraft, the Marine Corps AV-8B fleet, and select squadrons from the EA6B, E-2C, and S-3 communities from an antiquated legacy mission planning system to a portable Windows-based laptop computer system, the Joint Mission Planning System. The team demonstrated excellence in engineering, technical documentation, logistics, installation, training, and customer support.

SSC San Diego team members included J.C. Fitzgerald, Jeff Scott, Rob Wood, Wayne Stuetzel, Brent Pfeiffer, Dean Pfeiffer, Jerry Persinger, Diane Rehmann, Keith Mack, Eddie Skidmore, Rob Hunsucker, Joshua Crook, Bill Earl, Aaron Rother, Megan Nanni, Tom Boyles, Doug White, Anthony Brancato, David Bartkus, Jeff Hobbs, Audrey Pfeiffer, Maurice Civers, Dave Downing, Roger Hagofsky, Jeff Heintzelman, Pat Watts, Joe Woodward, Kim Yarborough, Dan Cordomi, Ed Emett, Brian Larson, Jesse Yarbrough, Bill Duffy, David Baskerville, Bill Imle, Tom Knight, and Tom Longo.

Legacy Network and Server Reduction Team

Responding to the Chief of Naval Operations goal of a 20-percent reduction of infrastructure, the Legacy Network and Server Reduction Team was able to execute a 23-percent reduction of servers that reduced the total active networks from 24 to 20. This represented a major accomplishment as only eight Echelon II organizations out of 24 met or exceeded their 20-percent reduction goal.

SSC San Diego team members included Ty Wernet, JR Islas, Greg Lawrence, Brian Riehm, Ron Broersma, Doug Hamaguchi, Al Cassedy, Paul Lichtenstein, David Stevens, Stan Durbin, Ed Van Houten, Grely Ponce, Dr. Randy Moore, Larry Mohr, Mike Phillips, Andy Patterson, Tom Gronholt, Burt Edwards, John Laccone, Kit Kitamura, Celia Metz, Luis Gonzalez, Jim Senese, Cynthia Nguyen, Jorge Mora, Kate Schemensky, Debbie Tharp, Bob Holub, Linda Russell, Jim Mathis, and Susan Pasterkiewicz.

FORCEnet Integrated Architecture System and Technical View Team

The FORCEnet Integrated Architecture System and Technical View Team successfully developed an integrated set of naval enterprise system and technical architecture products that reflect the Navy and Marine Corps intentions to implement FORCEnet. The team also developed the supporting processes to ensure collaborative development among the Marine Corps, other system commands, and primary DoN stakeholders.

SSC San Diego team members included Jennifer Padgett and Inman Breaux.

Submarine Operating Authority Modernization Effort Team

The Submarine Operating Authority Modernization Effort Team successfully completed initial operational capability by installing the Submarine Operating Authority console, hardware, cabling, and associated software tools at Commander, Submarine Force Atlantic Fleet and Commander Task Force Six Nine.

SSC San Diego team members included Bruce Cosby, Charles Braun, Minh Ta, Ruth Brown, Dave Stribling, Ronald Wang, Kenneth Wray, Jim Hubin, Chanh Vuong, Phuong Nguyen, Tina Nguyen-Tran, Dave Robinson, Michelle Sund, Larry Campbell, Bob Franco, Rick Ponce, Ron Diaz, Douglas Hovermale, Monica Dukes, George Vajgrt, Mike Hammock, Jim Logsdon, Henry Santos, Robert Hunt, Alex Burke, Lori Willey, Rene Burrell, Denise Munoz, Steve Jacoby, Michael McQuilken, Ken Spaulding, Rob Walkley, Bruce Weekley, Rob Christensen, Nancy Spaulding, Suzanne Hagman, Steve Biro, and Ruth Russell.

Navy Marine Corps Intranet (NMCI) Certification and Accreditation (C&A) Team

The NMCI C&A Team significantly improved security posture for the NMCI network of 420,000 customers. The timely identification and mitigation of enterprise risks resulted in accreditation of three Network Operations Centers and achievement of the first Enterprise Approval to Operate. As a result, the NMCI C&A process has become the model for the rest of the Navy.

SSC San Diego team members included: Tom O'Dea, Tim Barnett, Rick Camargo, Sylvia Salazar, Karen Manley-Guerrero, Dina Demuth, Clay Oeholke, Gannon Graue, Dee Johnson, Erwin Mier, Hoa Nguyen.

Navy Multiband Terminal - Security Integrated Product Team

The Navy Multiband Terminal - Security Integrated Product Team successfully completed a "cost as an independent variable" effort to research, negotiate, and define the essential set of security

requirements for the Navy Multiband Terminal. This effort will result in a development and production savings in excess of $30 million as well as additional lifecycle savings.

SSC San Diego team members included Justin Gutzmer and Mike Raizada.

Computer Network Defense - Afloat Team

The Computer Network Defense - Afloat Team designed, tested, and implemented the Host-Based Security Solution aboard USS *Blue Ridge* (LCC 19) in support of Terminal Fury 2007. The contributions the team members ensured that this cutting-edge technology provided superior network protection during an extremely important and far-reaching exercise.

SSC San Diego team members included Brian Whyte, Billy Haynes, Louis Gates, Dennis Mattison, Alan Godwin, Binh Duong, Alan Chu, Robert Ducote, Robert Barksdale.

Ultra High Frequency (UHF) Satellite Communications (SATCOM) Systems Team

This team provided critical UHF SATCOM capabilities and training to four forward deploying E-2 squadrons in support of the Global War on Terrorism. In meeting the Naval Air Systems Command requirements and deadlines, they saved over $920 thousand and delivered the equipment 5 nths earlier while overcoming delays.

SSC San Diego team members included Jon Kershaw and Brigette Larson.

Legacy Messaging Consolidation Team

The Legacy Messaging Consolidation Team's exceptional knowledge, dedication, and initiative ensured successful execution of legacy messaging consolidation. This effort enabled the closure of eight legacy messaging sites and re-homing the end-users to two remaining sites. The results were a significant cost savings to the Navy. SSC San Diego team members included Robert Buisan, Robert Delizo, Melissa Kolberg.

Navy Community Service Award[67]

The 2007 Navy Community Service Award was presented to SSC San Diego for its Health, Safety, and Fitness Program by Navy Region Southwest. Center personnel whose contributions led to receiving this award included:

Rick Wilson and Steve Koepenick for safety support to the Association for Unmanned Vehicle Systems International Competition.

Mark Roser for coordinating the SSC San Diego blood drives in the San Diego community.

Joel Baumbaugh for serving as a judge for the 53rd Annual Greater San Diego Science and Engineering Fair and motivating young people to pursuing studies in science, engineering, computer science, and mathematics.

John Moore, Everett Sappenfield, Mike McGinnis, and Robert Swain for participating with the Center-sponsored Point Loma Amateur Radio Club (PLARC) in the American Radio Relay League "Field Day." PLARC's mission is to provide a reliable means of emergency communication.

John Boehme for preparing the Center input for the 2007 Navy Region Southwest Community Service Program Award.

EXTERNAL/INDUSTRY RECOGNITION

2007 NDIA Award[68]

The National Defense Industrial Association, San Diego Chapter Awards Committee selected ET1(SW) Christopher Cooke to receive the 2007 A. Bryan Lasswell Award for Fleet Support. ET1(SW) Cooke was systems administrator for the Combined ENTerprise Regional Information eXchange System (CENTRIXS) while forward deployed at Commander U.S. Naval Forces Central Command/U.S. Fifth Fleet Combined Maritime Forces. CENTRIXS was designed and fielded to address multinational information sharing across networks. Petty Officer Cooke was tasked to manage all facets of network administration and maintenance. This included workstation and desktop support; hardware maintenance and replacement; software implementation; and testing, planning, and fielding of computers and peripherals on the networks. He was lead administrator for one domain with over 20 workstations and four servers; and assistant administrator on three other domains with 200 computers and 350 users. He built redundancy into the network and implemented a server for Windows Server Update Services to deploy the latest Microsoft product updates to networked computers. This effort ensures that the network has the latest, critical security patches. Petty Officer Cooke was able to research and remove unneeded computer services and implement daily backups to avoid potential system failures. He also worked with the Electronic Key Management System to track keying material expiration, inventory, and destruction.

2006 TSPI/EO Award[69]

The International Test and Evaluation Association presented the 2006 Time Space-Positioning Information and Electro-Optics (TSPI/EO) Award to Delmar Haddock, Advanced Technology Branch, for his enthusiasm, leadership, and tireless professional dedication. The award recognizes Haddock's efforts to provide long-range imaging capabilities and infrared sensors to test ranges.

Haddock played a major role in implementing the Range Commander Council's Optical Systems Group charter. The charter is to develop the capability to deploy mobile, high optical power tracking telescopes, and to specify for acquisition large infrared focal planes with increased sensitivity to meet DoD data collection requirements. Haddock accomplished this by accepting the chairmanship of two Optical Systems Group subcommittees: the Long-Range Optics Committee and the Infrared Focal Plane Committee.

While leading these two committees, he made many significant achievements in the field of optical engineering and systems management. Haddock was instrumental in developing and delivering:

- Six 15-inch, multi spectral, multi focal-length, ruggedized Classical Cassegrains
- Two 2.5-meter, 24-inch Distant Object Altitude Measurement System telescopes modified for operation in the infrared
- Two Jonel 100 telescopes modified for the infrared and upgrade kits for five additional systems
- A 32-inch telescope upgraded and modified for operation in the infrared with total capability for visible and near-infrared performance
- Creation of two sea-borne, own-ship motion stabilized, 0.75-meter Stabilized High-Accuracy Optical tracking systems to include state-of-the-art tracking mounts and all related software packages

Haddock pioneered and provided leadership in the field of image restoration through the use of an innovative software technique known as "multi-frame blind deconvolution." He established a network

of researchers, encouraged potential consumers, constructed test scenarios, and pressed applications engineers to try the concept.

CENTER CIVILIAN AWARDS

Lauritsen-Bennett Award[70]

Bill Jacobs

Bill Jacobs received the Lauritsen-Bennett Science Award for significant contributions to radio frequency photonics for enhanced Navy communications, navigation, and surveillance capabilities Mr. Jacobs is a leading authority on optically controlled radio frequency (RF) switching, high-speed, high-power photodetectors, RF-over-fiber systems, and photonic analog-to-digital conversion. He has served as the leader and principal investigator on programs sponsored by the Defense Advanced Research Projects Agency, Office of Naval Research, National Security Agency, Office of Naval Intelligence (ONI), Defense Acquisition Challenge Program, and PEO-C4I (PMW 180). Jacobs provides direct, technical support to develop new capabilities and plan for future program activities. He provides expertise to identify areas of risk, possible solutions or alternatives to problems, and planning for future program activities. As the RF Photonics project manager for the ONI Low Profile Mast Program, he led his team to investigate the application of RF-over-fiber signal distribution for Virginia Class submarines. This application has progressed to the acquisition phase. Early in his career, Jacobs performed research and development in piezoelectric polymers, stochastic/non-linear dynamics, and fractal image compression. He has received three patents and authored/co-authored 24 refereed journal or book articles, 17 conference publications, and 10 technical reports. Jacobs' demonstrated scientific excellence has directly contributed to fleet readiness and national security.

Cliff Warner

Cliff Warner received the Lauritesen-Bennett Engineering Award for outstanding technical leadership in communications and networking in the development and application of rapid network-centric information exchange. Since joining the Center in 1979, Cliff Warner has led the advancement of communication-networking technology and helped establish SSC San Diego as a communication-networking Center of Excellence. Under the Battleforce Composite Networking Project, sponsored by the Office of Naval Research (ONR), Warner and his team developed an approach to exchange tactical data-link messages over Internet Protocol networks. His team demonstrated that this approach would satisfy tactical data-link real-time constraints. The Aegis Ballistic Missile Defense System (BMDS) Program Office recognized this work as an enabling technology to transition the BMDS to the Global Information Grid. He has conceived and proposed ONR-funded projects to advance U.S. Navy networking from stove-piped, system-unique solutions to network-centric vehicles of rapid information exchange and FORCEnet enablers. Sponsors and colleagues recognize Warner for his outstanding technical, management, and leadership skills and as one of the Center's pre-eminent engineers. Warner's boundless dedication, technical skills, and nurturing style of leadership and management have led to execution of numerous, highly beneficial programs for over 27 years.

Mike Schraeder

Mike Schrader received the Lauritsen-Bennett Staff-Support Award for for outstanding leadership and accomplishments in corporate business operations. As part of the SSC San Diego's Corporate Business Operations, Mike Schrader executes diverse duties, often in response to statutory, regulatory, or Department of the Navy (DoN) mandatory requirements. Center management relies on his corporate

business knowledge, experience, team building skills, and dedication to satisfy these requirements to achieve positive recognition and respect for the Center. Representing the Center in all Base Realignment and Closure (BRAC) matters for over 10 years, he has planned, budgeted, and executed previous BRACs for SSC San Diego. Schrader developed a corporate strategy to focus and shape the workforce of tomorrow when DoN civilians were placed under the responsibility of the Deputy Chief of Naval Operations. In response to counter-terrorism and disaster initiatives, he defined, designed, developed, implemented, and executed the Center's new mustering capability. He develops Center presentations for high-ranking officials. Schrader's leadership skills, corporate knowledge, personal commitment, and dedication have helped to ensure that SSC San Diego continues as the premiere command, control, communications, computers, intelligence, surveillance, and reconnaissance laboratory.

Executive Director's Award[71]

The Executive Director's Award was presented to Ken Register in recognition of his leadership contributions as SSC San Diego's New Professionals (NP) coordinator. Since 2000, Mr. Register has served as the Tactical Systems Integration and Interoperability Division Head. He manages the daily operations for 170 employees with an annual budget of $85 million. He was instrumental in initiating the recent stand up of the Joint Tactical Radio System. Under Mr. Register's leadership, thousands of applicants for the NP program have been screened for employment. Each candidate has received a positive experience and ample opportunity to market their skills and talents. Each department has had the opportunity to interact and observe potential employees.

Exemplary Achievement Awards[72]

Robert Agricola led a series of high-visibility operational field experiments and new technology demonstrations as manager for Project Fairfield.

Elise Alcaraz-Cornelius flawlessly coordinated successful high-level inspections and audits.

Curtis Allen proposed and implemented innovative contracting strategies to balance demanding customer needs with acquisition regulations and policies.

Ronald Anderson exceeded all goals and established new benchmarks as the Navy's Coalition Warrior Interoperability Demonstration site coordinator and advanced concepts site manager.

Richard Ardolino provided leadership for developmental and operational test and evaluation of the Joint UHF Military Satellite Communications Network Integrated Control System Program.

Sherry Ashbaugh managed all Center construction and environmental site approvals with conscientious respect for the environment.

Frank Bantell is the lead engineer serving on the staff of Commander, Pacific Fleet, whose work has been critical to adoption of the Combined Enterprise Regional Information Exchange System Cooperative Maritime Force Pacific Network.

Ana Borja provided full-time support to the Joint Tactical Radio System program while continuing to oversee and build on the SPAWAR and PEO C4I Human Systems Integration efforts.

Timothy Boyce planned and executed a $22 million logistics budget and directed a large distributed team of engineers, logisticians, and technicians for the Naval Air Systems Command Strike Planning and Execution Systems Program Office.

Mark Breeding enhanced communications training for the Submarine Radio Room for Pacific and Atlantic Fleet submarine command school houses.

Scott Browne provided outstanding technical support to the Commercial KU Band Satellite Communications Limited Objective Experiment demonstrating a significantly enhanced warfighting capability.

Charles Carik designed, developed, integrated, tested, and evaluated the bathymetric navigation-processing portion of the Ocean Survey System. He also developed a high-resolution, multi-beam sonar replay program for the United Kingdom.

Eric Cartagena contributed to radiation-hardened, silicon-on-insulator integrated circuits for the Trident missile. He played a critical role in designing several integrated circuits to meet the stringent specifications required for the missile upgrade.

Joseph Celano led a team of government, industry, and Border Patrol personnel to integrate, test, and field BorderNet, the first secure wireless network tactical information sharing system deployed for Border Patrol field operations.

Steven Chance expanded the Integrated Test Facility/Baseline Test Facility laboratory space in response to his customer's increasing testing requirements.

Thomas Charters negotiated funding for installation efforts of over $3 million in FY 05, $4 million in FY 06, and $6 million in FY 07 for the Wide Area Alerting and Notification and Early Warning systems.

Dennis Cheng completed a short-fused, high-visibility project to extend Combined Enterprise Regional Information Exchange System network or the Comprehensive Maritime Awareness Joint Capabilities Technology Demonstration out to Singapore.

DruAnn Clark maintained full operational capability when the Mark 5 Marine Mammal System was transferred to SSC San Diego from Explosive Ordnance Disposal Unit Three.

Stanley Clayton maintained the Center's environmental awareness while serving as the environmental coordinator for the Integrated Circuit Fabrication Facility and division manager for complex laboratories and test ranges.

Norman Coscia supports the Joint Tactical Radio System Airborne, Maritime Fixed Station as the systems requirements and verification branch chief.

Stacey Curtis managed a range of environmental research and development projects for the Pollution Abatement Ashore Program and linked technology and technologists from SSC San Diego with Commercialization of Advanced Technologies partners and other DoD sources of advanced technologies.

Ryan Davis contributes to the successful ongoing operations and enhancements to fleet expeditionary Marine Mammal Systems.

Robert DuCote served as team lead for SPAWAR's carrier local area network assessment effort.

William Fitzgerald provided systems engineering expertise to a broad spectrum of C4ISR programs.

Matthew Fleming teams with his technical partners in developing business strategies for technical requirements and quality support to customers.

Steven Francis completed a $1 million project at the New Sanno Armed Forces Recreation Center Hotel in Tokyo, Japan, that increased security at the hotel and brought the facility in line with the new Anti-Terrorism Force Protection model.

Ruth Gallegos defined and standardized Team SPAWAR's business processes as the subject-matter expertise for the Check-In to Check-Out Scenario team.

Louis Gates spearheaded a pilot of the Host-Based Security System aboard USS *Blue Ridge* (LCC 19) during the Terminal Fury 2007 operational exercise.

Gary Gilbreath serves as the task manager and lead software developer for Multi-robot Operator Control Unit software for unmanned surface vehicles that will be fielded this year with the first Littoral Combat Ships.

Mark Gillcrist contributed to the Deployable Autonomous Distributed System program, the Survivable Undersea Sensors project, and the Deployable Autonomous Distributed System program.

Kari Gizzi led the team that installed the Digital Era Current Intelligence Decision Environmen/Knowledge Web at the Kunia Regional Signals Intelligence Operations Center.

Robert Gordon exceeded sponsor requirements as the project manager for the Brooklyn Project. He serves as a representative to the Project Manager's Advisory Council.

Vicki Goren made outstanding contributions as a member of the Executive Officer's Job Pro team and was presented the Center's Secretarial Award.

Dustin Grettenberger provided outstanding mechanical engineering expertise in ocean engineering and ocean systems development, production, and fleet integration.

George Hartmann provided technical and contracts expertise, communication skills, and an analytical approach to problem solving that enhanced sponsor confidence, customer satisfaction, and high levels of tasking and funding.

Dave Hebert led his engineering logistics team in identifying engineering change proposals that could improve reliability and maintainability to meet the Marine Corps mandate for 90 percent operational availability of Marine Air Traffic Control and Landing System equipment.

Olga Herrera is team lead for the West Coast Electronic Key Management System, C4ISR installation manager, installation resource manager for Naval afloat networks, and project manager for anti-terrorism/force protection installations.

Kathleen Hickey developed new algorithms and processes for analyzing acoustic data collected for locating and tracking subsurface vessel traffic.

Veronica Higgins is lead for the Net-Enabled Command Capability's participation in Trident Warrior 2007, meeting all challenging sponsor requirements.

Brendan Hill is the project manager and lead engineer for the Cobra Enable Project, which provides critical support for deployed remote intelligence, surveillance, and reconnaissance sensors.

Jolene Hollingshead is a member of the Interoperable Communications Technical Assistance Program to facilitate communications and business processes; and bring diverse public-safety agencies together to develop successful, unified communications plans.

Robert Holub takes on functions and responsibilities beyond those of a traditional facilities manager, and enables the department to continually improve.

Chris Horne is the lead government witness for Navy terminals in advanced extremely high frequency inter-segment tests and lead government systems engineer for the Time-Division Multiple Access Interface Processor.

Gary Ivarson led the development, design, testing, and installation of the integrated shipboard Automatic Identification System (AIS). His leadership was critical to the successful rapid deployment capability integrated AIS installation on USS *Ronald Reagan*, completing the first fully integrated AIS installation on a force-level ship.

Gregory Jaccard delivered a diverse array of specialized sensors as lead mechanical engineer for the 1092/R and the Radioactive Detection Identification and Computation Programs.

Carousel Jagualing methodically detailed and analyzed financial processes and made innovative changes to enable life-cycle extension and upgrades to legacy fleet systems.

Steven Kerns led a major shipboard communications suite groom onboard USNS *Shasta* (AE 33); supervised the removal, inventory, and shipping of C4I assets from decommissioned ships; and supported C4I equipment service life extension programs.

Kevin Kumferman captured funding for technical work from the Defense Advanced Research Projects Agency and Homeland Security Advanced Research Projects Agency bringing in science and technology work for the Center.

Ted Kramer provided support as the software technical lead for the Family of Integrated Rapid Response Equipment program, the centerpiece the U.S. Army's Comprehensive Force Protection Initiative Exercise.

Wai Chak Kwong served as project manager of the Tripler Army Medical Center Facility Branch's system engineering support.

Rita Lane improved communications interoperability nationwide through her leadership of the Interoperable Communications Technical Assistance Program and the Communications Asset Survey and Mapping tool.

James Lang provided exceptional information technology leadership to the Multi-Agency Exchange program to meet developmental and operational goals.

Thomas Lawless is the regional information assurance officer for the Multi-Agency Exchange program, providing secure information technology environments and enhancing the range of services and products for national missions.

BeEm Le leads a team in performing interoperability testing in the Center's Reconfigurable Land-Based Test Site Laboratory. He is the project lead to design, implement, and run a C4ISR node of the Navy Distributed Engineering Plant.

Tamara Leeper is responsible for the successful demonstrations, exercises, and other operational events that utilize the Center's Information Operations Center of the Future facility.

Anna Leese De Escobar is principal investigator for several projects in "state of the art" cryogenic radio frequency technologies. She helped support and facilitate the transition of high-temperature superconducting filters into PMW-180 programs of record.

Genevieve Leisz provides expert guidance in personnel policies, regulations, and processes, and serves as an advisor and mentor across her division and department in addition to her responsibilities as a division resource manager.

David Lindberg established the Super High Frequency Satellite Communications Branch as the lead in-service engineering agent (ISEA) for the Super High Frequency Satellite Communication program.

Christine Liou supported several important wireless ad-hoc networking projects with a combination of technical and managerial expertise to help each team overcome many obstacles to the "system of systems."

Hana S. Li-Torres served as the Green Belt and leader of a Lean Six Sigma team reviewing service center processes. This effort resulted in the Comptroller certifying service center rates and establishing a process for future rate development and certification.

Alan Lockwood managed all aspects of obtaining certificate accreditation for the Joint Interagency Task Force South Multi-sensor Input Tracking and Control System, a critical requirement for continued joint service operation.

Anna Louie led numerous computer network vulnerability teams to conduct information security assessments within the Pacific Theater and worked on multiple DoD enterprise-wide computer network defense initiatives to improve information assurance within the U.S. Pacific Command area of responsibility.

John Lovett is supervisor for the Fleet Support and Training Office managing numerous activities for C4ISR systems including on-site technical assists, distance support, and fleet training.

Randy Mactal has management responsibility for Radiant Mercury and the Swampworks Knowledge Management Team. He is deputy project manager for the FORCEnet Implementation Tool Suite, helping define and achieve FORCEnet goals.

Cindy Magsombol helped develop the Interface Control Working Group process for the development and approval of Joint Tactical Radio Systems Standards (JTRS), and development and adoption of numerous JTRS application program interfaces.

Ty McConkey is the project manager for the Cryptographic Network Management Workstation, the Global Positioning System User Equipment Identification Database, and the Key Management Infrastructure Mission Planning/Mission Management System research projects.

Keith McFarlane is the Cryptologic On-Line Trainer deputy project manager and software process improvement lead. He is trusted agent for the Combat Direction Finding and Cooperative Outboard Logistics Update tactical cryptologic systems.

Dave McKinley managed the Situational Awareness Geospatial Enterprise Project for U.S. Northern Command and is leading the Unclassified Common Operational Picture initiative within DoD.

Tim Mehlhorn provided support to Headquarters U.S. Pacific Command's information assurance and computer network defense programs.

Kathy Mullens assisted the Executive Steering Committee in overseeing Center-level committees and process improvement actions. She facilitated the first SSC San Diego *Outlook* issue dedicated to Center-level process improvement issues.

David Mullins oversees 14 Lean Six Sigma events as the first, formally certified Lean Six Sigma Black Belt for the Fleet Engineering Department.

Donn Murakami supported fleet communications at the Pacific Region Network Operations Center at Wahiawa, Hawaii, and through exercises such as Trident Warrior, Terminal Fury, and Rim of the Pacific.

Randall Olsen leads development of a high-gain, electronically steered, lightweight antenna technology; and the research of novel directional networking protocols that could revolutionize military communications.

Lyle Ostensen is the deputy program manager for the Littoral Combat Ship (LCS) C4I program providing direct technical and managerial support to PEO C4I and the LCS Program.

Nathan Paradis demonstrated technical expertise and managerial skills to interface with program managers from the Pentagon Force Protection Agency and the Defense Threat Reduction Agency.

Jan Park led the test team supporting the Distributed Ground Test 01 for the Ballistic Missile Defense System against simulated ballistic missile threats. He helped advance the Missile Defense team in achieving an all "Blue" Top Ten Best Practices.

Ritesh Patel led his team to Web-enable Joint Warning and Reporting Network Block 2 software, and demonstrate it to acquisition program managers and the chief systems engineer.

Aaron Perez helped plan the transition of the Naval Modular Automated Communications System and Fleet Broadcast legacy systems to Internet Protocol. This has led to official release of the Navy Tactical Messaging Transition Plan to the feet that will save $12 million annually.

Gigi Reed established new coalition interoperability projects to enhance and expand bilateral intelligence information exchange capabilities and improve collaboration.

Juan Rivera led the transition of over 41,000 users from legacy networks to the newly installed Outside the Continental United States Navy Enterprise Network infrastructure at 14 Navy sites around the world.

Antonio Ramos developed and implemented Shore Installation Process Training for Center personnel. From March 2006 to March 2007, he trained 126 personnel on the Shore Installation Process Handbook, Fleet Readiness Certification Board Process, and Shore Installation Policies and Guidelines.

Melinda Ratz is the assistant program manager for the Commercial Broadband Satellite program, a new program of record that will provide a substantial increase in bandwidth throughput capability to the Fleet.

Lois Savage greatly contributed to the customer focus, professionalism, and quality of the Center's Training Office and Defense Acquisition Workforce Improvement Act program.

Micky Richeson led numerous naval facility installations of shore processing systems. He designed and conducted training courses in acoustic tracking and reporting for fleet personnel.

Terry Sampitè contributed to the Interoperable Communications Technical Assistance Program to improved communications interoperability for many urban areas in the United States.

Gabor Schmera is a nationally recognized expert on applying nonlinear and stochastic analysis to engineering problems. He is often sought out by other services and agencies to consult on chemical sensing projects.

Eric Scrimpsher managed the Common Data Link Management System development, which brought new joint range extension and time slot allocation capabilities in tactical data management to U.S. Navy Ballistic Missile Defense and allied naval platforms.

Thomas Shay is the Navigation Sensor System Interface (NAVSSI) test engineer responsible for testing, evaluating, and recommending NAVSSI Block 4.2.0 and Block 4.2.1 software for fleet release.

John Sheplock oversaw the tripling of the Joint Mission Planning System International project from three to nine current and pending Foreign Military Sales cases in less than six months.

Daryl Smith is the acquisition assistant program manager for the Taiwan PoSheng program. He oversees C4I delivery orders totaling over $700 million including all production, F-16 and Mirage aircraft integration, and software development.

Bob Spink played a vital role in fleet readiness with the coordination and resolution of over 60 critical Tactical Data Link issues and his effective management of Link-16 and Joint Interface Control Officer project plans.

Gregg Starynski provided design analysis and engineering specifications for the Distributed Common Ground System-Navy to reduce the existing hardware footprint from seven racks to three, saving the Navy $5 million per system.

David Steber led his branch to comply with a short-fused and complex requirement that allowed the Center an interim authority to operate two critical Navy financial applications.

William Steeger managed Advanced Concept Technology Demonstrations for the Coalition Theater Logistics, the Joint Enable Theater Access-Sea Ports of Debarkation, and the Coalition Mobility System Joint Capability Technology Demonstration. He served as a panel member at the 2006 Armed Forces Communications and Electronics Association TechNet Conference.

Craig Swepston oversees the Mark 5 Marine Mammal System, the Mark 5 spares effort, and the juvenile animals designated for the Swimmer Interdiction System at Naval Submarine Base, Kings Bay, Georgia.

John Switlik provides technical, financial, and management support to PMW-160's information assurance activities for new ship construction.

Daniel Telesco enabled the Special Forces to contribute time-critical intelligence to the Joint Special Operations Task Force-Philippines Operational Commander during Operation Enduring Freedom-Philippines.

Jeffrey Thomas is project manager for the Automatic Identification System Server/Extensible Common Operational Picture project. He led the Anti-Submarine Warfare Command and Control Limited Objective Experiment, and integrated Automatic Identification System capability installations.

Kim Trieu supported software test and evaluation projects including the Common Operational Environment, Joint Protection Enterprise Network, Net-Enabled Command Capability, and the WebSked project.

Katherine Vesey supervised SSC San Diego vendor payments and increased productivity while streamlining processes.

Kristine Vuong leads development of a web-based enterprise collection of Joint Tactical Radio System waveform applications, operational environments, and documentation.

Steven Watkins, technical director for the Commander, Pacific Fleet, Fleet Command Center and Makalapa Complex, oversaw 28 battle cells used by over 600 personnel in Terminal Fury 2007.

Nate Watne was instrumental in the expansion of the Systems Integration Facility and the continued success of the test and evaluation support team.

Chester Wong successfully oversees the financial management and financial operations for SSC San Diego's largest service center.

Dwight Yoshinaga guided the Component C4 Systems Engineering Branch through business and staffing challenges while expanding the branch's business base.

Frances Young acted as a subject matter expert for a Lean Six Sigma team that reviewed service center processes and established a new documented and sustainable process for future service center rate development and certification.

2007 Secretarial Awards[73]

For Sustained Exceptional Achievement

Secretarial Awards for sustained exceptional achievement were presented to Carol McDaniel, Navigation and Applied Sciences Department; Kim Vetter, Tactical Network Communications Branch; and Paula Steinkuehler, Networks and Information Systems Division.

Significant Group Achievement

Significant Group Achievement Awards were presented to four members of the Intelligence, Surveillance, and Reconnaissance Department assistant's team: Jeannie Carr, Barbara Holt, Linda Chandler, and Constance Clough.

Center Team Achievement Awards[74]

Center Team Achievement Awards were presented to the Miniature Intelligence, Surveillance, and Reconnaissance Sensor Technology (MIST) Team and the Joint Ultrahigh Frequency Military Satellite Communication Network Integrated (JMINI) Control System (CS) team.

MIST Team

The MIST program is the largest in-house Defense Advanced Research Projects Agency program at the Center, beginning in FY04. Based on the success of initial efforts, it was selected to proceed to Phase I in August 2004 and Phase II in January 2006. This classified multidisciplinary effort brought together scientists and engineers spanning the fields of digital design and radio frequency systems design, communication theory, advanced signal processing and stochastic processes, integrated circuit design, power systems, and mechanical engineering. Three significant accomplishments have been achieved by the MIST Project team:

- Development of the Minimalist Global Positioning System (GPS) technique. This technique uses unique algorithms and hardware implementations to geolocate a device, using the GPS constellation, within a Circular Error Probable of 12 meters. The Minimalist GPS technique achieves this accuracy at an energy consumption 300 times less than current commercial GPS technology.
- Development of a microelectronic integrated circuit switch-mode (Class-E) power amplifier using the IBM 7HP SiGe HBT technology to achieve an efficiency in excess of 70 percent at the transmit frequency and output power of interest resulting in world record performance.
- These technologies are used in the design of a miniature sensor. This sensor has demonstrated the ability to acquire GPS data using a fraction of a Joule of energy, and the rest of its functions at greatly reduced power rates.

This team completed a single chip integrated circuit design that contained over 60 million transistors, the largest single chip design ever produced by the Center. This single program has generated six patent disclosures and nine publications.

Team members included Jerry Brewer, Heidi Buck, Jener Chang, Nicholas Chen, Jiachi Chieh, Nelson Cysneros, Anastasia Dimitriu, Howen Fernando, Greg Fleizach, Ryan Frankel, Alan Fronk, Peter Grossnickle, Barry Hunt, Hugo Jazo, Tae Kim, Donald Lie, Donald Lowe, Kevin Lynaugh, Nate Melster, Henry Ngo, Matthew Nicholson, John Nugent, Sidharth Oza, Mark Roser, Jason Rowland, Daniel Sievenpiper, Jerome Symanski, Karl Wilhelm, Michael Wood, Yu Jhih (George) Wu, Everly Yeo, Diana Arceo, Brad Chisum, Dennis Cottel, Matthew Fong, Ralph Hunt, Nackieb Kamin, Jerry Lopez, Richard Middlestead, Raymond Mitchell, Robert Motyl, Chirag Patel, Jeremy Popp, Pat Sullivan, and Annie Yang.

JMINI CS

The JMINI CS is the control and management system for all joint warfighter users of ultrahigh frequency (UHF) military satellite communication (MILSATCOM). The JMINI CS controls the access to these MILSATCOM channels operating in both single-access and multiple-access modes.

Single-access mode is known as Demand Assigned Single Access. Multiple access mode is known as Demand Assigned Multiple Access (DAMA) and operation in DAMA mode has been mandated by the Joint Chiefs of Staff for UHF operations. The JMINI CS additionally provides software tools to help warfighter communications officers plan and schedule network use and the relative priority of this use over UHF MILSATCOM.

The control function of the JMINI CS is performed centrally within each of four global satellite footprint areas. JMINI control stations are located at the Naval Computer and Telecommunications Area Master Station, Pacific, at Wahiawa, Hawaii, and at Norfolk, Virginia. In addition, JMINI control stations are located at the Naval Computer and Telecommunications Stations (NCTS) at Finegayan, Guam, and at NCTS Naples, Capodichino, Italy.

Each control station houses the radio frequency hardware and antennas, and computer hardware and software systems controlling user access to satellite resources. The management function of the JMINI CS is distributed among the planners and managers of UHF MILSATCOM, which includes the Joint Chiefs of Staff and unified commanders in chief.

The success of the JMINI CS can be attributed to this team's professional dedication from inception, organization, program management, contracts, financial, development, configuration/data management, system administration, laboratory coordination, testing, integrated logistics support, security, facilities, installation, and operation. Team members included Teresa Anderson, Ted Andrews, Bill Brooks, Mark Conda, Leslie Davenport, Brian Devine, Greg Doriguzzi, Richard Felkins, John Fleming, Cheryl Francisco, Sid Graser, Eric Hillis, Craig LaMaster, Susan Manor, Joel Merrin, Orlander Moore, Kathy Nelson, Bob Nimmerfroh, George Pavlik Craig Smith, Maggie Stolebarger, Dong Ton, Jose Vasquez, Beth Walker, Aaron Weddle, Robert Williams, Kent Yang, Lori Zielinski, Susie Balisteriei, Mike Baraniecki, Beth Bojanowski, John Frey, Ryan Gould, Eric Herman, Martin Klein, Roger Kohls, Charlie Lee, Sophia Lontayo, John Merrell, Karen Myers, Giao Nguyen, Dominick Perritano, Dustin Price, John Thomas, Gary Thrapp, Patrick Wheaton, and Patti Wisman.

APPENDIX B: CY 2007 PATENT AWARDS

Inventor(s)	Title	Patent No.	Date
Olsen, Randall B.	Multiple-tapped optical delay line	7,174,073	6 Feb 07
Stein, David Walter	Method and system for detecting anomalies in multispectral and hyperspectral imagery employing the normal compositional model	7,194,132	20 Mar 07
Rodgers, John Scott Ptasinski, Joanna N. Russell, Stephen D.	3D photonic bandgap device in SOI	7,194,175	20 Mar 07
Schwartz, David F. Allen, Jeffery C. Helton, J. William	Predictor of minimal noise figure for wideband amplifier	7,194,390	20 Mar 07
In, Visarath Kho, Yong (Andy) Neff, Joseph D. Meadows, Brian K. Longhini, Patrick Palacios, Antonio	Multi-frequency sythesis using symmetry in arrays of coupled nonlinear oscillators	7,205,835	27 Mar 07
Lie, Donald Y. C. Popp, Jeremy	Switching mode power amplifier having increased power efficiency	7,205,835	17 Apr 07
Lagnado, Isaac de la Houssaye, Paul R.	Method of making a high precision microelectromechanical capacitor with programmable voltage source	7,232,699	19 Jun 07
Rodgers, John Scott Ptasinski, Joanna N. Russell, Stephen D.	3D photonic bandgap device in SOI method	7,233,730	19 Jun 07
Hendrickson, Lief M.	Communication system using variable pattern acousto-optic modulation	7,239,439	3 Jul 07
Custy, Edward John	Apparatus and method for incorporating tactile control and tactile feedback into a human-machine interface	7,245,292	17 Jul 07
Ptasinski, Joanna Shimabukuro, Randy L. Russell, Stephen D.	Corner cube chemical-biological agent	7,249,859	31 Jul 07
Henry, Willard I. Ho, Thinh Q.	Method and apparatus for multiband frequency distributed circuit with FSS	7,250,921	31 Jul 07
Russell, Stephen D. Shimabukuro, Randy L. Offord, Bruce W.	Silicon-on-sapphire display with audio transducer and method of fabricating same	7,253,869	7 Aug 07

Guitas, David R.	Method for inserting wires through braided shielding	7,257,889	21 Aug 07
Stein, David W.	Method and system for detecting anomalies in multispectral and hyperspectral imagery employing the normal compositional model	7,263,226	28 Aug 07
Padilla, Rudy S. Lovern, Michael G. Russell, Stephen D. Shimabukuro, Randy L.	Optical modulator	7,268,930	11 Sep 07
Rodgers, John Scott Ptasinski, Joanna N. Russell, Stephen D.	3D photonic bandgap device in SOI	7,269,323	11 Sep 07
Sullivan, Patrick M. Russell, Stephen D.	Flexible video display apparatus and method	7,274,413	25 Sep 07
Henry, Willard Ho, Thinh Q. Allen, Kevin	Frequency agile-collocated multi-signal RF distribution system	7,277,725	2 Oct 07

APPENDIX C: CY 2007 DISTINGUISHED VISITORS

January

29	Mr. Terry Halvorsen
	Deputy Commander, Naval Network Warfare Command
31	RDML Joseph Mulloy, USN
	Deputy COS for Plans, Policy and Requirements
	U.S. Pacific Fleet

February

27	The Honorable John G. Grimes
	Assistant Secretary of Defense for Networks and Information Integration/
	Chief Information Officer
	Department of Defense

March

28	American Society of Mechanical Engineers
29	Dr. Bobby Junker
	Department Head, C4ISR
	Office of Naval Research
29	Commodore Arne Morten Groenningsaeter
	Deputy Director General, Department of Personnel and General Services
	The Royal Norwegian Ministry of Defence

April

12-13	ADM James R. Hogg, USN (Ret)
	Director, Strategic Studies Group
	Office of the Chief of Naval Operations
23-26	Mr. George Solhan
	Deputy Chief of Naval Research
	Office of Naval Research
26	M.r Mark Neighbors
	Navy Deputy, Senior Language Authority
	Navy Personnel Command

May

24	Mr. Randy Cieslak

Chief Information Officer, U.S. Pacific Command

24   RADM Alan Hicks, USN
            Program Director, AEGIS Ballistic Missile Defense
            Missile Defense Agency

June

4   Dr. John Riley
            Chief Maritime Operations Division
            Defense Science & Technology Organization

5   Walter J. Davis (VADM, USN, Ret)
            Director, CommNexus

            CommNexus Attendees

5-6   Science Advisor/Associate Director's Day

11   Dr. Cynthia Dion Schwarz
            Associate Director, Network Technologies
            Deputy Under Secretary of Defense (Science & Technology)
            Director for Defense Research and Engineering

11-12   Mr. James Bechtel
            Intellectual Property Counsel of the Navy
            Office of Naval Research

21   VADM Denby Starling, II, USN
            Commander, Naval Network Warfare Command

27-28   Dr. Delores Etter
            Assistant Secretary of the Navy (Research, Development, & Acquisition)
            Office of the Secretary of the Navy

28   Dr. Michael McGrath
            Deputy Assistant Secretary of the Navy (RDT&E)
            Office of the Assistant Secretary of the Navy

29   Mr. Daniel Dell'Orto
            Principal Deputy, Office of the General Counsel
            Department of the Navy

            Mr. David Beardon
            Principal Deputy, Office of the General Counsel
            Department of the Navy

July

17   RDML(s) Michael A. Brown, USN
            Director of Operations, Office of the Chief of Naval Operations

19   Dr. Charles Hutchings
            Navy Test, Evaluation & Technology Office (OPNAV N912F)
            Office of the Chief of Naval Operations

| 30 | Dr. Ronald Sega |
| | Under Secretary of the Air Force |

| 30 Jul-2 Aug | Mr. John Galloway |
| | Executive Director, Program Executive Office Littoral & Mine Warfare |

August

| 9 | Saint Mary's Academy Students |

| 9-10 | Ms. Terry Roberts |
| | Deputy Director, Office of Naval Intelligence |

| 13 | Ms. Oreta Stinson |
| | Acting Director, Office of the Secretary of the Navy Small Business Programs |

14	Mr. John Thakrah
	Chief of Staff for the Honorable Delores Etter /
	Deputy Assistant Secretary of the Navy Management & Budget

27	Mr. Robert Salesses
	Chief of Staff, Homeland Defense and America's Security Affairs /
	Principal Director, Crisis Management and Defense Support to Civil Authorities
	Office of the Assistant Secretary of Defense, Homeland Defense
	& America's Security Affairs

27-28	GMAJ Koen Gijsbers, RNA
	Assistant Chief of Staff Command, Control, Communications, Computers &
	Intelligence
	Allied Command Transformation

September

27	Ms. Linda Newton
	Deputy Chief of Staff for C4I / Command Information Officer
	Commander, U.S. Pacific Fleet

October

2	Director John Walters
	Office of National Drug Control Policy
	The White House

| 15 | The Honorable Frank Jimenez |
| | General Counsel, U.S. Department of the Navy |

| 15 | VADM Yang-Won Sur, ROKN |
| | Vice Chief of Naval Operations, Republic of Korea |

| 23 | VADM Denby Starling, II, USN |

Commander, Naval Network Warfare Command

November

5	ADM Robert Willard, USN Commander, U.S. Pacific Fleet
7	Mr. Greg Spencer Executive Director, Office of Naval Intelligence
8	RDML Joseph Mulloy, USN Deputy COS for Plans, Policy and Requirements, U.S. Pacific Fleet

December

10-11	Dr. Walter Jones Executive Director, Office of Naval Research
13	LGEN(s) His-Lieh Liu, AF Deputy General, Ministry of Defense, Taiwan

APPENDIX D: CY 2007 MAJOR CONFERENCES AND MEETINGS

January

9	SSC San Diego Echelon III Review

February

27-28	Information Systems Technology Advisory Committee Meeting

March

5	High Altitude Exo-Atmospheric Nuclear Survivability Technical Interchange Meeting
7	Hardened Electronics & Radiation Technology Conference
21-22	IMNARSAT-4 Summit Meeting
23-25	Office of Naval Research Logistics / C4I Technology Review

May

18	SSC San Diego Echelon III Review
24	AFCEA San Diego C4ISR 29th Annual Symposium Breakout Session 5 (Annual Classified Symposium)

June

18-29	Naval Research Advisory Committee Summer Study

July

10	The MITRE Corporation Technology Roadshow
25-27	Stress Physiology Program Review
30 July-2 Aug	National Fire Control Symposium

September

5-6	Low-Energy Nuclear Reactions/Condensed Matter Nuclear Science
10-21	The Technical Cooperation Program Maritime Systems Group Action Group 6
25	Coast Guard Specific Emitter Deepwater Identification

October

23-25   The Technical Cooperation Program Sensor Signal Processing Panel
Annual Meeting

November

30   SSC SD Echelon III Review

APPENDIX E: ACRONYMS

AC2	Autonomous Command and Control
ACT	Allied Command Transformation
ADM	Acquisition Decision Memorandum
ADNS	Advanced Digital Network System
ADS	Advanced Deployable System
AIS	Automatic Identification System
AUGV	Autonomous Underwater Gliding Vehicle
BMDS	Ballistic Missile Defense System
BRAC	Base Closure and Realignment
BRITE	Baseline for Rapid Iterative Transformational Experimentation
BTS	BMDS Test Bed, San Diego
C&A	Certification and Accreditation
C2	Command and Control
C3	Command, control, and communication
C4ISR	Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance
CAO	Competency Aligned Organization
CCC	Common Core Capability
CENTRIXS	Combined Enterprise Regional Information Exchange System
CMMI DEV	CMMI Development
CMMI	Capability Maturity Model Integration
CRF	Crypto Equipment Repair Facility
CTF	Commander, Task Force
CY	Calendar Year
CVW	Carrier Air Wing
DAESSEI	Data Accessibility Enhancements to Support Specific Emitter Identification
DAMA	Demand Assigned Multiple Access
DARPA	Defense Advanced Research Projects Agency
DMR	Digital Modular Radio
DoN	Department of Navy
Ed Tech	Educational Technology
EHF	Extremely High Frequency

EIT	Electronic and Information Technology
EOD	Explosive Ordnance Disposal
ERP	Enterprise Resource Planning
FEC	Full Expeditionary Capability
FEMA	Federal Emergency Management Agency
FET	Fleet Exercise Test
FTM	Flight Test Mission
FTT	Flight Test Terminal
FTX	Flight Test Experiment
FY	Fiscal Year
GCCS	Global Command and Control System
GCCS-M	GCCS-Maritime
GMD	Ground-Based Midcourse Defense
GPS	Global Positioning System
GTD	Distributed Ground Test
GUIDE	GPS User Equipment Identification Database
HAIPE	High Assurance Internet Protocol Encryption
HAP	High Assurance Platform
INE	In-Line Network Encryption
IPT	Integrated Product Team
ISNS	Integrated Shipboard Networks System
ISS	International Space Station
IT	Information Technology
IUID	Item Unique Identifier
JDN	Joint Data Network
JICO	Joint Interface Control Officer
JMINI CS	Joint Ultrahigh Frequency Military Satellite Communication Network Integrated Control System
JMPS	Joint Mission Planning System
JMSDF	Japan Maritime Self-Defense Force
JOEF	Joint Operational Effects Federation
JPEO-CBD	Joint Program Executive Office for Chemical and Biological Defense
JPM IS	Joint Project Manager for Information Systems
JS	Japanese Ship
JSS	JICO Support System

JTF	Joint Task Force
JWARN	Joint Warning and Reporting Network
Kweb	Knowledge Web
LCS	Littoral Combat Ship
LOE	Limited Objective Experiment
LoT	Launch-on-TADIL
LSS	Lean Six Sigma
M&A	Measurement and Analysis
MBO6	Monterey Bay 2006
MDA	Missile Defense Agency
MEMS	Joint Ultrahigh Frequency Military Satellite Communication Network Integrated Control System
MESA	Mathematics, Engineering, Science Achievement
METMF(R)	Meteorological Mobile Facility (Replacement)
METOC	Meteorology and Oceanographic
MGF	Maritime GCCS Family of Systems
MIST	Miniature Intelligence, Surveillance, and Reconnaissance Sensor Technology
MMP	Marine Mammal Program
MOT&E	Multi-Service Operational Test and Evaluation
MTA	Multi-TDL Architecture
MTN	Multi-TDL network
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NAVSSI	Navigation Sensor System Interface
NBCR	Nuclear, Biological, Chemical, and Radiological
NCTAMS PAC	Naval Computer and Telecommunications Area Master Station Pacific
NFAAS	Navy Family Accountability and Assessment System
NGC2P	Next-Generation Command and Control Processor
NMCI	Navy Marine Corps Intranet
NPS	Naval Postgraduate School
NSA	National Security Agency
NSPS	National Security Personnel System
OA	Operational Assessment
OAS	Organizational Assessment Survey
OMN	Operation and Maintenance, Navy

ONI	Office of Naval Intelligence
ONR	Office of Naval Research
OPFAC	Operational Facility
OPM	Office of Personnel Management
OPN	Other Procurement, Navy
ORD	Operational Readiness Demonstration
OSD	Office of the Secretary of Defense
OSPSS	Ocean Survey Program Survey System
PLARC	Point Loma Amateur Radio Club
PMG	Project Management Guide
POR	Program of Record
RAHS	Risk Assessment and Horizontal Scanning
RAPTRS	Recon Adaptive Patrol Tactical Robotic Sentry
RDAT&E	Research, development, acquisition, test and evaluation.
RF	Radio Frequency
RFID	Radio Frequency Identification
Rx	Receive
SAR	Search and Rescue
SATCOM	Satellite Communications
SCAMPI	Standard CMMI Appraisal Method for Process Improvement
SDFO	Small Diameter Fiber Optic
SEI	Specific Emitter Identification
SIT	Systems Integration Test
SPAWAR	Space and Naval Warfare Systems Command
SSA	Software Support Activity
SSC San Diego	Space and Naval Warfare Systems Center San Diego
STJ	Satellite TDL-J
SUBOPAUTH	Submarine Operational Authority
T&E	Test and Evaluation
TACSAT	Tactical Satellite
TAMPS	Tactical Automated Mission Planning System
TDL	Tactical Data Link
TDL-J	Tactical Data Link-Joint
THAAD	Flight Test Terminal High Altitude Area Defense

TRANSDEC	Transducer Evaluation Center
TSG	Tactical Shore Gatewayi
TSPI/EO	Time Space-Positioning Information and Electro-Optics
Tx	Transmit
UHF	Ultra High Frequency
UK	United Kingdom
WGS	Wideband Global SATCOM
WSM	WaterSpace Management
YA	NSPS Standard Career Group – Professional/Analytical
YB	NSPS Standard Career Group – Technician/Support (YB)
YE	NSPS Scientific and Engineering Career Group – Technician/Support
YP	NSPS Standard Career Group – Student

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2008 by Mr. John Thackrah (ASN RDA, Acting), The Assistant Secretary of the Navy, Research Development and Acquisition, 1000 Navy Pentagon, Washington, DC 20350-1000.

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